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AUTHOR Bertram, Charles L.; And Others
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ABSTRACT

This report describes a project that developed and field tested a model for projecting state-wide manpower needs in the allied health and nursing occupations in West Virginia and presents projections made for sixteen allied health and nursing occupations in the Charleston area. The content of the report is presented in three sections. The first covers the project purpose and methodology. Section 2, comprising three-fourths of this report, contains the projection of manpower needs for sixteen allied health and nursing occupations and for each occupation includes occupational description, sources of data, supply characteristics, demand characteristics, and training needs. The sixteen occupations covered are registered nurse, certified/registered nurse anesthetist, licensed practical nurse, operation room technician, radiologic technologist, cytotechnologist, medical laboratory technician, medical record technician, dental hygienist, physical therapist, respiratory therapist, nuclear medicine technologist, medical technologist, certified laboratory assistant, registered dietitian, and physician's assistant. The last section summarizes the projections and offers some recommendations for further studies. (EM)

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PROJECTED ALLIED HEALTH AND NURSING TRAINING NEEDS FOR A SEVEN-COUNTY AREA IN WEST VIRGINIA

by

Charles L. Bertram
Robert D. Childers
Berma H. Lanham
Marcia R. Lynch
John E. McClure
Marilyn B. Slack

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PREFACE

Following is a projection of the training needs in each of 16 allied health and nursing occupations for a seven-county area of West Virginia. Projections are only extensions of present data bases and should not be regarded as firm and fixed boundaries. Employment opportunities in any of the occupations can change markedly as a result of local or national policy changes or changes in client demand for certain types of health services.

The first section of the report gives background descriptions of the manpower projection project, describes the methodology, and explains certain assumptions in some detail. The second section gives a description of each of the 16 occupations and the projection of training needs for that occupation. One table of similar format indicates the training needs for each of ten years, 1978-1987, for each occupation. The third section contains a summary of training needs for each of the occupations and a critique of the methodology used for the projections, including recommendations for conducting future manpower studies.

The projections have been completed for the Charleston Area Health Education Center by an AEL research team organized especially for the project. Dr. Robert D. Childers has been responsible for directing data collection and assisting with preparation of the report. Dr. John E. McClure gave technical advice and gave some assistance with report preparation. Mrs. Marcia R. Lynch assisted with data collection, Mrs. Berma A. Lanham with report preparation and analysis, and Mrs. Marilyn B. Slack with data analysis. The project was under the direction of Dr. Charles L. Bertram.

The research team wishes to express appreciation to many who have helped with the project. Without the cooperation of the employing agencies and

training institutions, the project could not have been completed. In particular, the team wishes to express appreciation to Dr. Charles H. White, Executive Director, Health Systems Management Corporation, Oakland, Ca., whose advice was invaluable to the team. We are especially appreciative of the time and advice given by Mr. Leslie W. Melton, project officer for the Area Health Education Center operated by the Charleston Area Medical Center.

C. L. B.
R. D. C.

SECTION I

DESCRIPTION OF ALLIED HEALTH AND NURSING MANPOWER PROJECT

INTRODUCTION

In the past, many educational programs have been based on hunches and guesses regarding future personnel requirements. Fortunately, the guesses have frequently been accurate. However, when miscalculation does occur, an area is either faced with an over supply of trained personnel, which is a considerable waste of human talent and resources required for training, or the area is faced with an under supply of trained personnel, which means that the area does not have persons sufficiently trained to meet serious social needs.

The problem is especially acute in the allied health and nursing areas, since the health services represented by these occupational areas are quite important to our society, and considerable resources are required to train individuals for the various occupations. Therefore, the purpose of this project is to study and develop procedures for making projections which will facilitate approximate equality between supply of and demand for health service personnel, and to apply these procedures to a seven-county area of West Virginia.

Description of Project

The Allied Health and Nursing Manpower Project began as a contracted endeavor between the Area Health Education Center operated by the Charleston Area Medical Center and the Appalachia Educational Laboratory. In addition to personnel from the Area Health Education Center, individuals representing the West Virginia University Regional Medical Program, the State Department of Health, and the Health Systems Agency provided valuable assistance in formulation and selection of procedures for the project. Through numerous

discussions, the survey and projection procedures described in this report came to be regarded as most appropriate to the field situations. The need for an accurate projection became even more evident as the study progressed, and the initial objectives were sharpened to better reflect the needs of those concerned with the training of health personnel.

The staff of AEL is pleased to submit this projection of the training needs in each of 16 allied health and nursing occupations during the next two, five, and ten years. The need for more accurate manpower information and the objective of the project are described in the following pages. Latter parts of this section describe the methodology used for the study and problems which became apparent during the study.

Need for Manpower Information

The need for allied health and nursing manpower information pertaining to training needs and employment opportunities comes primarily from three sources.

Individuals making career choices. Accurate, up-to-date, and localized information concerning employment and training opportunities in all health occupations is needed. Career decisions should be based on complete and accurate information. The need is even more crucial in the nursing and allied health areas, because recent sociological changes and technological advances have caused numerous changes in demand for health services and opened up some areas completely unfamiliar to the students and their counselors. As more fully described later, the amount of accurate information which can be presented is severely limited by confusion and uncertainty regarding the nomenclature of some of the 16 areas studied, and by the lack of data available for projections. However, the results of the current study

will give some indication of future employment opportunities as well as an indication of serious gaps in available information.

Institutions training health personnel. The primary focus of this study is on the training needs for each of the occupations. Those institutions in the seven counties which train nurses and allied health personnel need to know what size classes to request, and health planners need to know what number of personnel are required to meet present and future employment needs. They also need to know the number of trainees which is required to yield the desired number of employees following the training, since many locally trained students may accept employment in other areas or, for one reason or another, decide not to go into the labor force. Also, some employees come from other areas, and there are presently no training programs in the seven-county area for seven of the 16 occupations studied.

Providers and suppliers of services. Those agencies which deliver health services, such as hospitals, clinics, nursing homes, and laboratories, need to have accurate information about the number of employees required to meet anticipated demand, as well as the number of trained personnel they can expect to recruit from various sources. Facilities must be built, budgets prepared, and service areas organized so that the projected demand can be effectively met.

This report is therefore organized so as to present available manpower information to three target audiences: career counselors and their students, those responsible for training allied health and nursing personnel, and those who provide health services to the public.

Purpose of the Project

The long-range purpose of the manpower project was to develop an operational model for projecting training needs in 16 allied health and nursing occupations suitable for use in West Virginia. The more immediate purpose was to complete a preliminary projection of the training needs in the seven-county Charleston area planning and development region as a test of the model.

The literature concerning projections, especially in nursing and the allied health occupations, and concerning studies completed by other states and regions was reviewed in order to permit selection of an appropriate set of procedures for West Virginia. As initially expected, the procedures were based on expected demand for health services and projected supply according to present trends.

This report represents the outcome of the project and includes a description of the data collection and projection procedures, a delineation of the projected training needs of the Charleston area, and a set of recommendations for further development of the project. Following is a list of four objectives used to guide project activities and an indication of how these objectives were met in order to provide useful information for the previously mentioned client groups.

The four objectives were to:

- Develop a preliminary model for projecting state-wide needs for the allied health and nursing occupations
- Field test the model in a seven-county area in West Virginia
- Project the training needs for 16 allied health and nursing occupations in the seven-county Charleston area
- Suggest procedures which might be used for a state-wide manpower projection

Develop a preliminary West Virginia model for projecting training needs. One important objective of the project was to develop a set of procedures whereby allied health and nursing training needs for the next two, five, and ten years may be efficiently projected.

In order to meet this objective, numerous documents were requested and studied. Many of these are listed in the attached reference list. Also, discussions with individuals provided valuable insights, and actual data collection activities added a touch of realism.

The "model" which evolved was not a mathematical formula, or not even one which can be easily diagrammed, but rather a set of procedures (1) for obtaining the most accurate data possible, (2) for obtaining some expectation of future demand from personnel in health planning, training, and administration, and (3) for making comparisons of supply and demand. The specific procedures are discussed later in this section.

The "model" is also a set of suggestions of things not to do. The project has provided Laboratory personnel valuable experience, and some of which is reflected in the report.

Field test the preliminary model. The second specific objective of the project was to field test the model through use in the seven-county Charleston area. The counties from which and for which data have been collected are Fayette, Kanawha, Boone, Clay, Lincoln, Putnam, and Roane. As indicated by Figure 1 and later discussions, these counties are near the center of the state and should be fairly representative of its rural/urban composition. Therefore, the procedures used for this study should have state-wide applicability and, to some degree, be generalizable to the state.

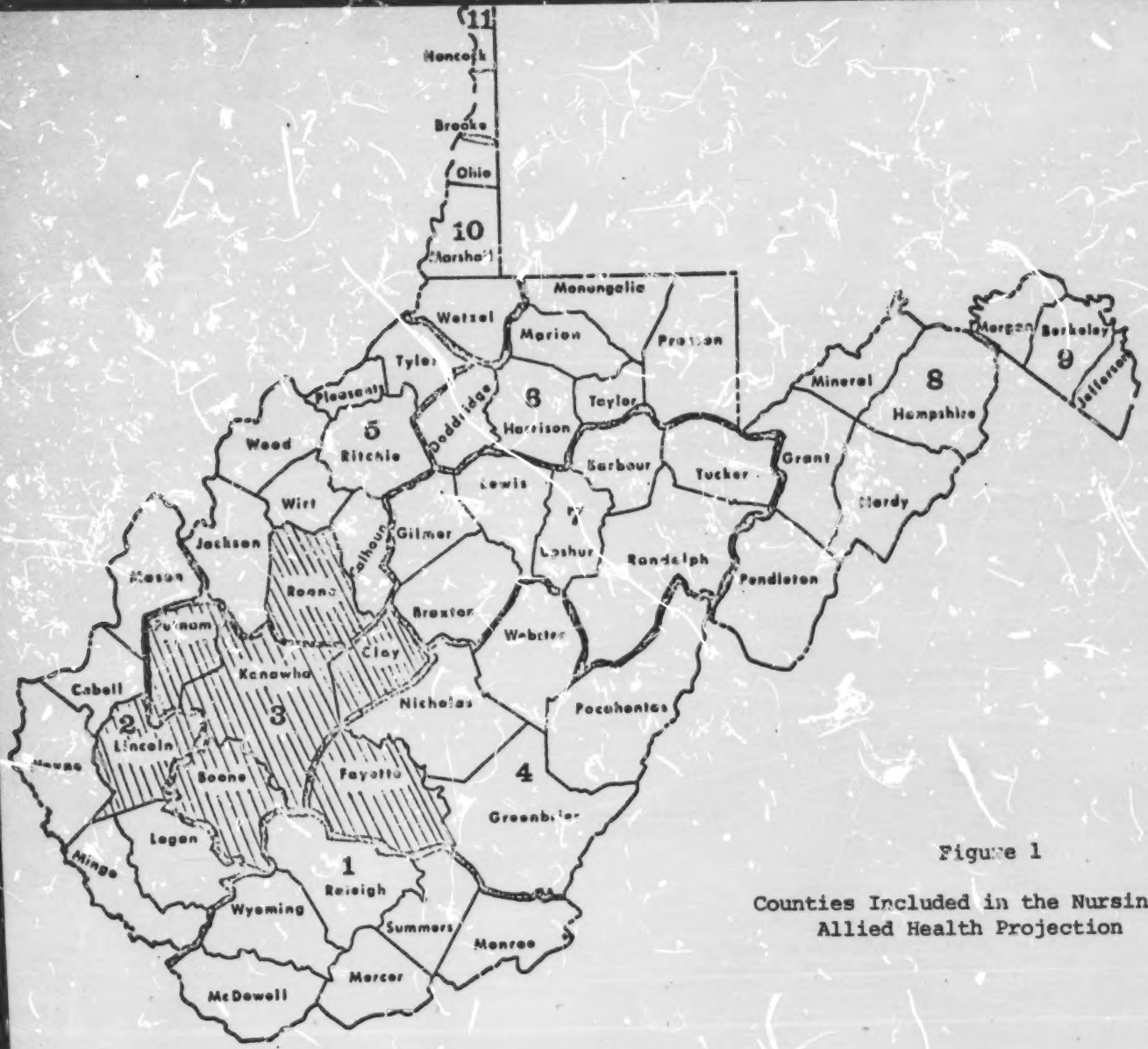

Figure 1

Counties Included in the Nursing and Allied Health Projection

Project Charleston area training needs. The third objective of the project was to provide data concerning the training needs in each of 16 nursing and health occupations for the next two, five, and ten years. The projection included in this report resulted from the field test, and to the degree that they are judged accurate by advisory groups, the results can be used for planning training programs for the seven-county field test area.

Criteria for selection of the 16 occupations were: (1) the importance of the occupations so far as presumed future regional training needs are concerned, (2) the likelihood that emerging technology or shifting staff utilization patterns will influence training needs, and (3) the expected likelihood that meaningful data were available. After careful consideration, the 16 occupations agreed upon were those listed in Table 1.

The 16 occupations in Table 1 are listed according to whether or not training is presently available in the seven-county area. The occupations are positioned in this manner here and in subsequent sections of the report because data for the two groups serve slightly different purposes. For the first group, decisions must be made regarding whether local training programs should be expanded or reduced to meet expected changes in demand. In the second, the decisions are of the order of whether or not expected increases in demand warrant the expense of beginning new training programs, or whether measures should be taken to assure a supply of trained personnel from institutions outside the seven-county area.

Provide state-wide projection procedures. The fourth objective which guided the Allied Health and Nursing Projection Project was to describe procedures which appeared to have application for state-wide manpower studies. The achievement of this objective is reflected by the suggestions given in the third section of the report.

Table 1

List of Allied Health and Nursing Occupations
for Which Projections are Prepared

Training Available in Seven-County Area	
1. Registered Nurse	6. Cytotechnologist
2. Certified RN Anesthetist	7. Medical Laboratory Technician
3. Licensed Practical Nurse	8. Medical Record Technician
4. Operating Room Technician	9. Dental Hygienist
5. Radiologic Technologist	

Training Not Available in Seven-County Area	
1. Physical Therapist	5. Certified Laboratory Assistant
2. Respiratory Therapist	6. Registered Dietitian
3. Nuclear Medicine Technologist	7. Physician's Assistant
4. Medical Technologist	

The research team generally found, for example, that some of the data for licensed occupations could be almost as easily obtained on a state-wide basis as for a seven-county area, since that information was stored on State Department of Health computer tapes and the State Department of Health and respective licensure board staff members were quite cooperative. However, most of the data for state-wide projections will have to be carefully and meticulously obtained by personal interview and persuasion.

METHODOLOGICAL ISSUES

As indicated previously, numerous strategies were reviewed before a set of procedures was selected for the Allied Health and Nursing Manpower Project. The review included statements about methodology (69, 70), as well as examples of applied methodology (13, 15, 34, 50, and 57).

Review of Projection Methodologies

Four methodological approaches to estimating manpower requirements are discussed in detail in Kriesberg, et. al. (69, 70). Although only two of these methods have been used in the present study, an overview of each of the four methods is presented below.

The first of the four methods is known as the manpower/population ratio method. A ratio of the number of health personnel to the total population served is selected. The ratio is selected by a judgmental process. Experts may be asked to choose a ratio which represents an optimal or a minimal care situation. National or ratio norms can also be used in the establishment of the ratio. The ratio is multiplied by the target population to obtain the estimated manpower requirements.

$$\frac{\text{Manpower}}{\text{Population}} \times \text{Target Population} = \text{Estimated Manpower Requirement}$$

Another method is the service targets approach. Detailed standards for the provision of different kinds of services are developed. The standards are used to derive targets for the production of these services, then the manpower required to provide the services is computed. Data needed for the implementation of the service targets methods pertain to population, quantitative standards or norms for health services, work assignments and staffing patterns used in the provision of services, and manpower productivity.

The health needs method involves the determination of the kinds, amounts, and quality levels of services required to attain and maintain a healthy operation. The required services are converted into manpower requirements by the use of staffing and productivity standards. In order to use this technique, the extent of health needs must be defined, the personnel and treatment time for each health need must be established, and the amount of service to be provided by each worker must be set.

The fourth method, economic demand, involves determining what the health services people are willing and able to pay for, irrespective of the quality of the services obtained or their need for them. Methods used to obtain data are the survey of budgeted vacancies, economic analyses deriving manpower requirements from utilization or expenditure data, and an input-output model based on occupational and industry matrices. The budgeted vacancy method is probably the most popular of these possibilities. Data needed include current employment and budgeted vacancies for each of the selected occupations, projected employment for each target year, and the hours worked by each person.

The service target approach and the health needs approach were rejected for use in this study because of the extensive amount of data required by each method. Large amounts of time would have had to be spent by Laboratory and area medical personnel in the development of the data base. The project

staff felt that the information which would have been yielded by these two methods was not worth the effort required to produce it.

In the conventional literature, current supply is usually defined as the number of persons employed or actively seeking employment in a health occupation at a given time. Job seekers include the unemployed, new graduates, and those who have been inactive and are seeking to reenter the labor force. The number of persons employed or actively seeking work make up the "active" supply, while the "potential" supply includes the active workers plus those who might be attracted back into the labor force if circumstances were different. Figure 2 represents current supply and its components.

Future supply is estimated by determining the movement of personnel into and out of the current supply. The components of Figure 2 are analyzed to arrive at the future supply estimates.

Active supply can be estimated from an analysis of employer records and involves essentially the same data as does the budgeted vacancies approach to establishing demand, while organization membership lists or licensure records are the primary sources of information on potential supply. Data items usually collected in a licensure survey include demographic characteristics, education and training, current and past employment, geographic mobility, and occupational specialties. Limitations of the licensure survey as a method of establishing potential supply include the fact that not all specialties require licenses and the fact that some persons allow their licenses to lapse when they are not actively employed.

There are several problems associated with projecting occupational needs. These include the lack of year-to-year data on manpower requirements and the fact that employers do not typically record personnel data by occupational category. If job titles are used, sex and age data are frequently not collected.

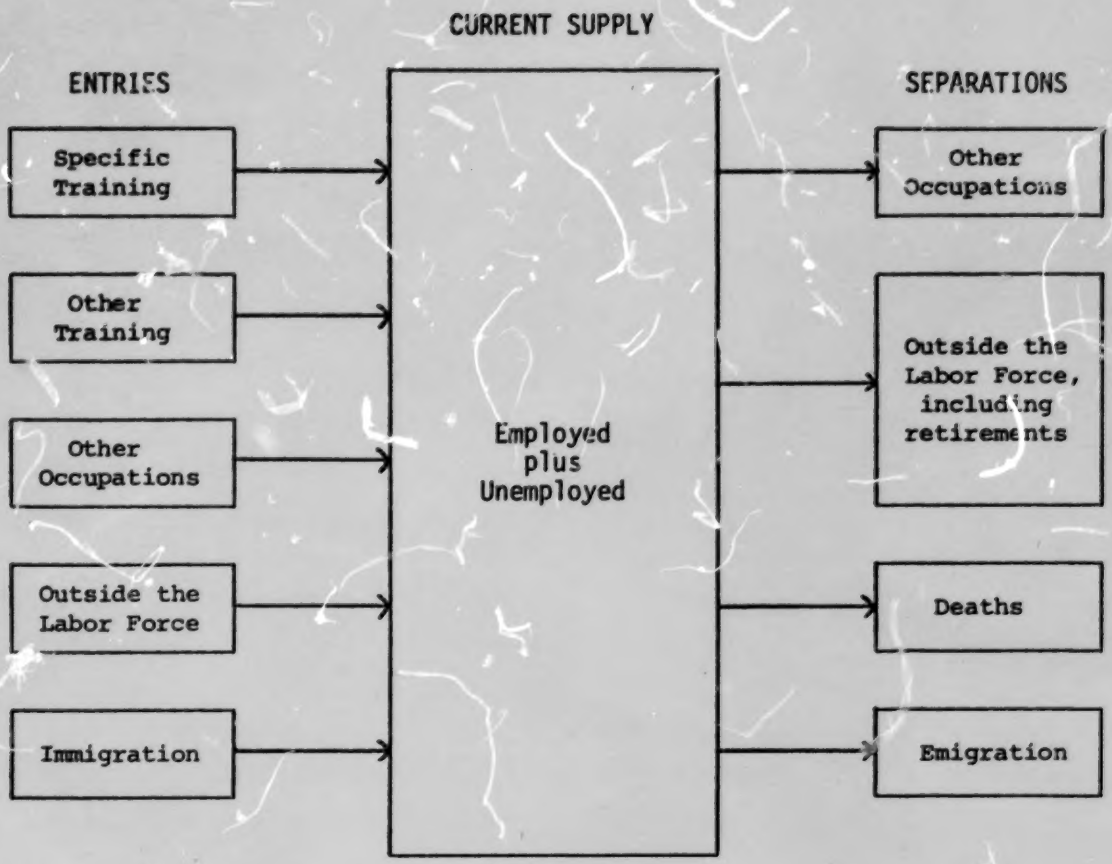

Figure 2

Flow of Workers Into and Out of an Occupation*

*Taken from Occupational Supply: Concepts and Sources of Data for Manpower Analysis, Bureau of Labor Statistics, 1974, p. 4.

The job titles used by many employers do not correspond to the Department of Labor's Dictionary of Occupational Titles (79). A serious problem is that job titles and job duties frequently do not correspond.

One of the commonly used methods of projecting manpower requirements is the use of trend data. The manpower requirements of recent years are carried into the future by the use of mathematical equations. These equations are based on the assumptions that the rates of change in the past can serve as a basis for representing rates of change in the future. Straight-line projections are normally used, but more complicated models are possible. The lack of historical data cited above is a major problem associated with accurate trend projections. A national health insurance program, as well as changes in treatment methods, could cause the past trend in manpower requirements to be a very poor model for projecting the future trend.

Population projections serve as one basis for the estimation of manpower requirements and the problems associated with these projections are similar to those associated with other types of projections. As indicated later, the state of West Virginia and the seven-county area under consideration in this study have lost population in each of the last two ten-year intervals between censuses. If this fact were projected into the future, an additional loss or population could be expected.

AEL Projection Methodology

The specific projection methodology used for the AEL Allied Health and Nursing Manpower Project was a combination of those previously described and uses slightly different definitions as described later. The projection methodologies were tailored to the particular problem of projecting training needs, rather than the general manpower projection problem for which the general techniques were designed.

The characteristics of the current supply, or number of persons working in each of the occupations, was determined through interviews with employers and analysis of licensure data. A list of employing agencies located in the seven-county area is included as Appendix A. The interview schedule and survey forms used with the various occupations are contained in Appendix B. Information concerning additions of locally trained employers to supply was obtained from the training programs within the seven-county area.

Once the number of persons currently employed in an occupation was determined, factors which were assumed to influence demand or growth over the next ten years were evaluated. The factors or predictors which were applied to the current supply were (1) the estimated number of persons to be employed in two years, i.e., in 1979, in five years, and in ten years; (2) changes in the number of individuals employed over the past five years; (3) the employers' indication of the number of employees required to provide optimum services; (4) their estimate of the percentage increase in services to be provided in two, five, and ten years; (5) projected changes in numbers of employees by the U. S. Department of Labor (78:48); (6) projected changes in numbers of employees by the Health Resources Administration (64:143); (7) indications of expected numbers of employees according to the nation-wide ratio of employees in the occupation to total population; and (8) other sources particular to each occupation. Information concerning most of the above factors was available for most of the occupations.

Once the increase in demand was determined for each of the ten years, two factors were applied to determine training needs. The first was the number required to meet increased demand due to growth or increased services, which was obtained by simple subtraction of each year's projected supply from the previous year. The second factor was the effective replacement or turnover,

which is the number of newly trained employees required to replace those who terminate employment for any reason. No attempt was made to project total turnover, only that part which will be replaced by addition of newly trained employees. The effective replacement rates were determined by evaluating (1) the annual turnover rates reported by local employers and (2) the nation-wide ratio of "additions to supply by graduates" to total supply as reported by the Health Resources Administration.

The number of newly trained employees required to meet effective replacement needs plus the number required to meet increased demand due to growth yielded the number of newly trained employees required in each occupation each year. One assumption of uncertain validity is that practically all positions opening because of growth will be filled by newly trained employees. In terms of the total available supply, the assumption is probably true, but it needs further study. In all cases, the factor or combination of factors which appeared most reliable was selected as the basic projection. Combinations or single factors which provided optimal and minimal results were used for maximum and minimum projections.

For those occupations with training programs in the seven-county area, the percent of graduates who tend to remain in the area was determined by historical data and used to indicate local additions to supply. For this report, the additions were assumed to remain constant over ten years so that needed increases or decreases in current training programs can be easily determined.

Assumptions

The manpower projections for the allied health and nursing occupations are of necessity based on several assumptions. Hopefully, the research team

was aware of most of them. Realistically, the projections are based on a large number of interrelated and complex factors and variations in any one could seriously affect others.

Constant size of population. The "best guess" for population increase or decrease for the seven-county area was that it would remain constant over the next ten years. As described later, demographers employed by the Appalachian Regional Commission felt that most recent population studies indicated a constant population change rate, i.e., immigration will equal emigration for the seven counties (9:46-55).

An increase in coal-energy requirements, for example, could be responsible for a larger than expected increase in in-migration, or an increase in the tendency for young families to move to major urban centers could result in some increase in out-migration from the seven-county area. However, the projections are based on an assumed constant population change.

National health insurance. The projections of this report do not anticipate implementation of a National Health Insurance Program primarily because when and if the program will come into existence is unknown, and the degree of effect on health services demand is uncertain.

Implementation of a National Health Insurance Program would probably increase the demand for health services, and as of this writing, implementation within two or three years seems fairly certain, so the projections may somewhat underestimate the demand so far as national health insurance is concerned.

Increased malpractice suits. The number and severity of malpractice suits is expected to continue increasing at about the same rate as in previous years. The tendency is for more health services such as laboratory tests to

be requested as the number of suits increases, and this increased demand is presumably reflected by an annual increase in the number of allied health and nursing personnel required to meet the increased demand over the past few years.

The same straight-line increase in services due to malpractice suits is assumed to exist over the next ten years, and if the number and severity of suits levels off or decreases, the projections will overestimate demand.

Continuation of present health status. Another assumption underlying the projections is that no major and prolonged health problems will occur. An underlying assumption is that the general health status will continue, undeterred by epidemics, increased nuclear radiation, or other long-term effects.

No major technological breakthroughs. The projection is based on the assumption that there will be no major breakthrough in technology, such as would cause unemployment by major blocks of health services personnel.

No major attitudinal changes toward health services. The projections assume that the same general attitudes toward health services existent today will continue through the ten-year projection period. For example, if everyone decided to get at least one medical and dental examination each year, the demand on health service would increase considerably.

Continuation of general regional economic condition. The projections assume that the present economic structure and level present in 1977 will continue through the ten-year period. Some increases in economic level are expected because of the energy-related industries, and these should insure

that the population remains static, but possible increased demand due to economic gains is not included in the projections.

Demographic Characteristics of Seven-County Area

As shown in Table 2, the population of West Virginia and the seven-county area as measured by the U. S. Census Bureau has decreased through each of the last two decades (e.g., 60:126). The decrease would imply that fewer health services will be required in future years. However, as further shown in Table 3, a projection by the Appalachian Regional Commission indicates that the population loss has slowed in all but Kanawha County during the time period from 1966-1970 to 1970-1975 (9:46-55). In the other counties, there were changes from marked losses to sharp increases in population. Kanawha County contains 61.5% of the seven-county population, but has been decreasing in population less than the other counties have been increasing.

Other demographic characteristics are shown in Table 4. The population of the seven-county area is 54.6% rural, compared to 61.0% for the total state. The seven-county area had 21.4% of the state's population in 1970, and 20.2% of the state's physicians, dentists, and related practitioners.

Definitions

Clear and accurate definitions of terms used in the report are important to a meaningful explanation of the findings of the study. Each of the 16 occupations is described in Section II, and certain terms common to several or all of the occupations are given below.

Supply. In this report, supply is the total number of full-time equivalent persons employed in each allied health or nursing occupation at any given time.

Table 2

Population of Seven-County Area and State--1950 through 1970

	Year		
	1950	1960	1970
Boone County	33,173	28,764	25,118
Clay County	14,961	11,942	9,330
Fayette County	82,443	61,731	49,332
Kanawha County	239,629	252,925	229,515
Lincoln County	22,466	20,267	18,912
Putnam County	21,021	23,561	27,625
Roane County	18,408	15,720	14,111
Seven-County Total	432,101	414,910	373,943
West Virginia	2,005,552	1,860,421	1,744,237

Table 3

Population Change Rate in the Seven-County Area

County	1970 Population	1966-1970	1970-1975
Boone	25,118	-0.1% to -3.8%	7.7% to 12.0%
Clay	9,330	-3.9% to -19.9%	7.7% to 12.0%
Fayette	49,332	-3.9% to -19.9%	4.9% to 7.6%
Kanawha	229,515	-0.1% to -3.8%	-0.1% to -4.6%
Lincoln	18,912	-0.1% to -3.8%	4.9% to 7.6%
Putnam	27,625	6.3% to 9.9%	7.7% to 12.0%
Roane	14,111	-3.9% to -19.9%	2.5% to 4.8%

Table 4

Population Characteristics of Seven West Virginia Counties*

Area	Population	Percent Rural	Professional		
			Physicians, Dentists, & Related Practitioners	Health Workers Except Practitioners	Health Service Workers
West Virginia	1,744,236	61.0	3,304	8,322	9,156
Seven County Area					
Boone	25,118	97.0	4	67	105
Clay	9,330	100.0	0	0	6
Fayette	49,332	86.2	44	132	168
Kanawha	229,515	31.5	558	1,472	1,198
Lincoln	18,912	100.0	22	16	17
Putnam	27,625	82.5	17	62	82
Roane	14,111	100.0	24	79	119
Seven-County Total	373,943	54.6	669	1,828	1,695
Percent of WV Total	21.4		20.2	22.0	18.5

*Source: U. S. Bureau of the Census, 1970 General Social and Economic Characteristics, Final Report PC(1)-C50 West Virginia, U. S. Government Printing Office, Washington, D. C., 1972, p. 126 (col. 1-2), p. 299-303 (col. 3-5).

As used here, the term is similar to "work force," but does not include the unemployed.

Current supply. Current supply is the number of persons employed at the present time.

Future supply. Future supply is the number of persons expected to be employed in each occupation at a particular time in the future.

Demand. In this report, demand is defined as the effect of combination of factors which tend to increase supply. For example, increases due to demand lead to growth, or additional employees, within the occupation over time. No decreases due to lack of demand were anticipated.

Increased demand. Increased demand is an anticipated desire for additional employees within an occupation, or an increase in supply. Frequently, increase has a slightly different connotation in health services, but includes growth or any factors which might create vacancies for prospective employees in this report.

Need. Need is defined as the additional number of employees expected to be required in a subsequent year, from 1977 to 1978, for example.

Effective replacement needs. Effective replacement needs are defined as the number of newly trained employees, or graduates, which are expected to meet projected employment needs and does not include experienced persons only changing job locations.

Training needs. Training needs are the number of newly trained employees required to meet effective replacement or turnover, plus increases in supply due to demand or growth.

Methodological Problems

Methodological problems generally occurred at two levels. One pertained to the availability of workable models and systems of projections which were appropriate for field situations and have been described previously. The second level of problems pertained to existing local situations, or to the certain categories of occupations in the seven-county area. The second level of problems is discussed below so that other health planners may be aware of them before they begin collecting data, and so that those who review these projections may be aware of some of the obstacles which may influence the accuracy of the projections. Problems particular to single occupations are discussed in Section II, where the occupation is more fully described.

In addition to the general problem resulting from the lack of a commonly agreed upon methodology for manpower projection which could be applied to the field situation, numerous local conditions and irregularities were responsible for methodological difficulties.

Lack of comparable data. A most serious difficulty was caused by the lack of comparable data. For occupations that require licensing, considerable amounts of data were generally available, as is reflected by the following descriptions of registered nurses or physical therapists. However, there was hardly any longitudinal data available for any of the occupations, and this was considered a serious problem. Hopefully, these initial projections will provide a base for more accurate projections in subsequent years. One resulting difficulty was that a projection methodology used across all 16 occupations was required to be very simple and elementary.

Few followup studies were found, and several training institutions expressed difficulty in collecting followup data. The rate of return was extremely low.

There were sometimes irregularities in the data collection as attempted by AEL. For example, for some occupations, the personnel directors and directors of hospital programs within an employing agency reported slightly different numbers of employees for an occupation.

Lack of occupational definitions. The research team was appraised of the lack of occupational definitions prior to beginning the study, but actual field investigation revealed that even the health service personnel themselves frequently weren't sure whether they were technicians, technologists, or assistants. The issue was further complicated by the fact that certain groups of employees have considerable interest in having the occupations defined differently from those preferred by other groups of individuals. The confusion over occupational definitions partly resulted from the fact that there is frequently more than one certifying agency for a given occupation, and each may use their own terminology and standards for certification.

Where possible, the approach in this study was to use occupational descriptions given by an authoritative source. The descriptions were taken from the AMA Allied Medical Education Directory (64), the U. S. Labor Department's Occupational Outlook Handbook (76), and their Dictionary of Occupational Titles (79), in that order. If the occupation was not described in the first source, then the second, and then the third was consulted.

In no way is this study to be regarded as an attempt to establish definitions different from those commonly used, but rather the descriptions given in the report are for the convenience of projections.

Small sample sizes in some occupations. Some projections suffered from small sample sizes, as indicated in the separate occupational reports in Section II. Projections for occupations with only a few employees in the

seven-county area were especially hazardous and should have less dependence placed upon them.

Timing of the data collection. The timing of the data collection was unfortunate in some cases. Within another three months, licensure data would have been available for licensed practical nurses, for example. The license renewal time varies with different occupations. Also, the number of vacancies reported varies with the graduation dates, especially for those occupations with local training programs. Probably no time is "best" for completing such a study, but an optimal date should be sought.

Time and resource restrictions. The project was allowed less than six months for completion, from design to final report. The time was probably adequate and established time lines were met, but some shortcuts were taken. There was not time for sufficient reviews by recognized health planners and by practitioners as the project was being completed, nor of the report following its preparation. Ideally, this report should be reviewed by specialists from each of the 16 occupations, as well as by health planning specialists, but there is the practical constraint of time and an urgent need for the information contained in it.

SECTION II

PROJECTION OF TRAINING NEEDS FOR SIXTEEN ALLIED HEALTH AND NURSING OCCUPATIONS

INTRODUCTION TO OCCUPATIONS

The purpose of Section II is to present background data and projections for each of the 16 allied health and nursing occupations. Occupations which have training programs in the seven-county are presented in Part A of this section, and Part B contains projections for occupations for which there are presently no local training programs. One exception is that insufficient data were available to complete projections for physician's assistants. A report of the present status of the occupation is included as a replacement.

In this section, the occupational descriptions are excerpted from three authoritative sources. Two of the sources are in the public domain, and permission was granted by the American Medical Association to excerpt specified portions of the Allied Medical Education Directory, 6th Edition.

Much background information is provided in the tables of data, and especially for the nurses and physical therapists. Most of the occupations in Part A have tables indicating the age, sex, and number of recent graduates from training programs in the seven-county area. The final table for all occupations is the projection for training needs for that occupation.

PART A

Occupations With Training Programs in the Seven-County Area of West Virginia

REGISTERED NURSE

Occupational Description

Nursing plays a major role in health care. As important members of the medical care team, registered nurses perform a wide variety of functions. They observe, evaluate, and record symptoms, reactions, and progress of patients; administer medications; assist in the rehabilitation of patients; and help maintain a physical and emotional environment that promotes recovery.

Some registered nurses provide hospital care. Others perform research activities or instruct students. The setting usually determines the scope of the nurse's responsibilities.

Hospital nurses constitute the largest group of nurses. Most are staff nurses who provide skilled bedside nursing care and carry out the medical treatment plans prescribed by physicians. They may also supervise practical nurses, aides, and orderlies. Hospital nurses usually work with groups of patients that require similar nursing care. For instance, some nurses work with patients who have had surgery; others care for children, the elderly, or the mentally ill. Some are administrators of nursing services.

Private duty nurses give individual care to patients who need constant attention. The private duty nurse may sometimes care for several hospital patients who require special care, but not full-time attention.

Office nurses assist physicians, dental surgeons, and occasionally dentists in private practice or clinics. Sometimes they perform routine laboratory and office work in addition to their nursing duties.

Public health nurses care for patients in clinics, homes, schools, and other community settings. They instruct patients and families in proper care and give periodic care as prescribed by a physician. They may also instruct groups of patients in proper diet and arrange for immunizations. These nurses work with community leaders, teachers, parents, and physicians in community health education. Some public health nurses work in schools.

Nurse educators teach students the principles and skills of nursing, both in the classroom and in direct patient care. They also conduct continuing education courses for registered nurses, practical nurses, and nursing assistants.

Occupational health or industrial nurses provide nursing care to employees in industry and government and, along with physicians promote employee health. As prescribed by a doctor, they treat minor injuries and illnesses occurring at the place of employment, provide for the needed nursing care, arrange for further medical care if necessary, and

offer health counseling. They also may assist with health examinations and innoculations.

A license is required to practice professional nursing in all States and in the District of Columbia. To obtain a license, a nurse must be a graduate of a school approved by the State board of nursing and pass the State board examination.

Three types of educational programs--diploma, baccalaureate, associate degree--offer the education required for basic careers in registered nursing. All three programs prepare candidates for licensure; however, the baccalaureate program is preferred for those who aspire to administrative or management positions, and those planning to work in research, consultation, teaching, or clinical specialization, which require education at the master's level. Graduation from high school is required for admission to all schools of nursing.

Diploma programs are conducted by hospital and independent schools and usually require 3 years of training. Bachelor's degree programs usually require 4 years of study in a college or university, although a few require 5 years. Associate degree programs in junior and community colleges require approximately 2 years of nursing education.

Programs of nursing include classroom instruction and supervised nursing practice in hospitals and health facilities. Students take courses in anatomy, physiology, microbiology, nutrition, psychology, and nursing. They also get supervised clinical experience in the types of health problems. General education is combined with nursing education in baccalaureate and associate degree programs and in some diploma programs. (Excerpted from U. S. Department of Labor, Occupational Outlook Handbook, 1976-77 Edition [76: 470-471].)

Sources of Data

More data are available for registered nurses than for any other nursing or allied health occupation. Sources included the West Virginia Board of Examiners, the State Department of Health, two training programs, and the hospitals and other employers of nurses.

Permission was granted from the West Virginia Board of Examiners for Registered Nurses to use licensure data stored and processed by the State Department of Health, and the Department's Vital Statistics staff was most cooperative in completing analyses and tabulation according to specifications of the AEL research team. The data tapes contain a wealth of information concerning training and employment characteristics of nurses, much more than can be reported in the limited space available in this report.

Data were obtained by interview from the two colleges which offer training programs for registered nurses, and employers in the area were contacted to obtain demand and current supply information.

Supply Characteristics

Supply has been defined as the total number of employees in a given occupation at a specified time. Data concerning the current (1977) supply were obtained from both the State Health Department and employers. Data concerning additions to the supply were made available from the State Health Department and the training programs.

Full-time and part-time RN's. As indicated by Table RN-1, there were 1,342 nurses employed in the seven-county area, of which 1,072, or 80.0 percent were full-time and 270 were part-time. Additional analyses indicated that almost half part-time RN's worked more than 40 weeks during 1976 (Table RN-2),

Table RN-1

Registered Nurses Employed in Seven-County Area by Age

Age	Full-Time No.	Part-Time No.	Total No.	Total %
Under 20	2	2	4	.3
20-24	200	9	209	15.6
25-29	195	45	240	17.9
30-34	91	35	126	9.4
35-39	89	44	133	9.9
40-44	94	34	128	9.5
45-49	122	33	155	11.5
50-54	120	36	156	11.6
55-59	85	12	97	7.2
Over 60	74	20	94	7.0
Totals	1,072	270	1,342	100.0

Table RN-2

Number of Weeks Worked in 1976 as a Registered Nurse

Weeks	Full-Time	Part-Time	Total
Under 10	22	14	36
10-20	49	29	78
21-30	63	21	84
31-40	52	25	77
41-50	110	40	150
51-52	657	90	747
No Response	119	51	170
Totals	1,072	270	1,342

Table RN-3

Registered Nurses Employed in Seven-County Area by Race

	Full-Time No.	Part-Time No.	Total No.	%
Caucasian	1,045	270	1,315	98.0
Black	23	0	23	1.7
American Indian	0	0	0	
Oriental/Asian	4	0	4	.3
Other	0	0	0	
Totals	1,072	270	1,342	100.0

Table RN-4

Marital Status of Registered Nurses
Employed in Seven-County Area

	Full-Time No.	Part-Time No.	Total No.	%
Never Married	210	8	218	16.2
Married	673	235	908	67.7
Separated	7	3	10	.7
Widowed	58	14	72	5.4
Divorced	103	4	107	8.0
No Response	21	6	27	2.0
Totals	1,072	270	1,342	100.0

Table RN-5

Income of Registered Nurses Employed
in Seven-County Area

	Full-Time	Part-Time	Total
$3,000-4,999	5	0	5
5,000-6,999	13	0	13
7,000-8,999	114	2	116
9,000-10,999	395	3	398
11,000-12,999	288	2	290
13,000-14,999	131	3	134
Over $15,000	90	0	90
No Response	36	260	296
Totals	1,072	270	1,342

Table RN-6

Number of Full-Time and Part-Time Registered Nurses Practicing In and Out of State

	Number	Percent
West Virginia	7,037	81.8
Ohio	393	4.5
Pennsylvania	152	1.8
Virginia	135	1.6
Other	883	10.3
Totals	8,600	100.0

Table RN-7

Primary Field of Employment for Registered Nurses

	Full-Time	Part-Time	Total
Hospital	756	212	968
Nursing Home	11	4	15
School of Nursing	29	1	30
Private Duty	9	8	17
School Nurse	37	1	38
Occupational Health Nurse	51	3	54
Office Nurse	45	16	61
Community Health	59	8	67
Self-Employed	0	0	0
Other	58	11	69
No Response	17	6	23
Totals	1,072	270	1,342

which probably means that they worked only part of the time each week. Determination of the total contribution of part-time RN's to the labor force was therefore difficult, since the total number of hours worked was not available.

The ratio of full-time to part-time registered nurses is somewhat higher in the seven-county area than the national average projected by the Health Resources Administration (64: 129-130). According to them, the national average is now 70.4 percent full-time to 29.6 percent part-time, compared to 80.0 percent to 20.0 percent in the seven-county area. At the national level, the percent of full-time has gradually decreased from 90.2 percent in 1955 to the present 70.4 percent.

The median age of the full-time RN's in the seven-county area was 38 years, and 18.6 percent were less than 25 years of age. The median age of part-time RN's was 40 years, and as indicated by Table RN-1, the spread across the different age groups was rather even. A large majority (98.0 percent) of the employed RN's were Caucasian (Table RN-3), and more than two-thirds were married (Table RN-4). The median income for full-time nurses was $11,243 in 1976, and almost two-thirds of them made between $9,000 and $13,000 per year (Table RN-5).

Another factor affecting available supply is the number of nurses licensed in West Virginia but employed outside the state. These trained nurses could conceivably become employed in West Virginia. Table RN-6 indicates that, of the 8,600 full-time and part-time RN's licensed in West Virginia, 152 actually worked in Pennsylvania, 135 in Virginia, and another 883 were employed in other states but maintained their licensure in this state.

As indicated by Table RN-7, a majority (72.1 percent) of the RN's were employed at hospitals, and smaller numbers worked with community health organizations as office nurses and as occupational health nurses. Within

those employment settings, more RN's worked as general duty nurses (60.2 percent) than any other type position (Table RN-8). Of the full-time RN's, 17.5 percent were head nurses and another 9.7 percent were supervisors.

The educational characteristics of those who were practicing nursing in 1976 should give some indication of training requirements for the near future. More than half of the 1,072 full-time nurses (54.1 percent) had completed diploma programs, 33.1 percent had associate degrees, and 8.2 percent had a baccalaureate degree in nursing (Table RN-9). More of the full-time registered nurses specialized in medical and surgical areas than any other (38.4 percent), and 26.7 percent reported general practice as their primary specialty (Table RN-10). More of the part-time nurses reported general practice (37.8 percent) than any other specialty.

Only 60.8 percent of the full-time nurses working in the seven-county area graduated from schools located in those counties (Table RN-11). Another 39.2 percent of the nurses were trained in West Virginia, and 17.0 percent of them received their training in other states. The importance of these data is that those responsible for training and employing RN's may decide to train more nurses locally and depend more on external sources for fewer of the nurses required to replenish the supply and meet growth demands each year.

The year of graduation for the full-time RN's reveals an interesting supply pattern (Table RN-12). About 94 nurses have entered the seven-county supply each year of the past three, assuming that they entered following their year of graduation. However, only 60 nurses now working were graduated in 1972 and 1973. Either there was an increased demand of 34 nurses per year starting in 1974, or the RN's tend to work approximately three years following graduation and then remove themselves from the labor supply, thereby requiring that additional nurses be employed. The age distribution would seem to indicate

Table RN-8

Type of Position for Registered Nurses

	Full-Time	Part-Time	Total
Administrator	41	1	42
Consultant	13	2	15
Supervisor	104	14	118
Instructor	52	6	58
Head Nurse	188	16	204
General Duty	592	216	808
Nurse Associate	8	1	9
Clinical Specialist	2	0	2
Other	70	14	84
No Response	2	0	2
Totals	1,072	270	1,342

Table RN-9

Highest Degree Held by Registered Nurses
in Seven-County Area

	Full-Time	Part-Time	Total
Diploma	580	190	770
Associate Degree	355	55	410
BA--Nursing	88	16	104
BA--Other	26	7	33
MA--Nursing	12	1	13
MA--Other	9	1	10
Doctorate	2	0	2
Totals	1,072	270	1,342

Table RN-10

Primary Specialty of Registered Nurses

	Full-Time	Part-Time	Total
General Care	66	8	74
General Practice	286	102	388
Geriatric	24	6	30
Gynecologic/Obstetric	54	25	79
Medical/Surgical	412	86	498
Pediatric	52	13	65
Psychiatric	30	7	37
Other	133	19	152
No Response	15	4	19
Totals	1,072	270	1,342

Table RN-11

School of Graduation for Registered Nurses in Seven-County Area

	Full-Time		Part-Time		Total	
	No.	%	No.	%	No.	%
Schools in Seven-County Area	652	48.6	154	11.5	806	60.1
Schools in W. Va.	238	17.7	40	2.9	278	20.7
Out-of-State	182	13.6	76	5.7	258	19.2
Totals	1,072	79.9	270	20.1	1,342	100.0

Table RN-12

Year Practicing Registered Nurses Graduated from Training Programs

	Full-Time		Part-Time		Total	
	No.	%*	No.	%*	No.	%*
1943-61	362	26.9	113	8.4	475	35.4
1962-66	72	5.4	38	2.8	110	8.2
1967-71	127	9.5	50	3.7	177	13.2
1972	60	4.5	14	1.0	74	5.5
1973	60	4.5	9	0.7	69	5.1
1974	99	7.4	10	0.7	109	8.1
1975	90	6.7	11	0.8	101	7.5
1976	94	7.0	0		94	7.0
Data Not Available	108	8.0	25	1.9	133	10.0
Totals	1,072	79.9	270	20.0	1,342	100.0

a combination of factors, but perhaps more of the latter, since more than twice as many full-time nurses are 20-24 years of age as are 30-34 years old. The data deserve further study and analysis before definitive statements can be made.

The survey of employers in the seven-county area indicated that a total of 1,261 registered nurses were employed by 35 different agencies, including hospitals, nursing homes, clinics, industrial sites, and state health agencies. No attempt was made to contact the offices of MD's. The survey number of 1,261 is 94.0 percent of the 1,342 registered nurses reported by the State Health Department, so the demand data which follow are based on most of the population. The results also imply that most of the people employed in all 16 occupations were located, especially since no effort was made to locate RN's working in private offices.

Non-practicing registered nurses. One answer to any supply problem is that trained nurses not now practicing be encouraged to enter nursing. Informal interviews have indicated that these people are not easily lured back into nursing, but that potential supply should be described as one source of employees.

There are 360 licensed RN's in the seven-county area who are not practicing nursing for one reason or another (Table RN-13), as compared with the 1,342 full- and part-time nurses living in the area. Of the 360, 251 or 69.7 percent are unemployed and simply renewing their license, presumably in case they decide to practice nursing at a later time. In 1976, 53 RN's were working in other fields and 47 were retired but wished to remain licensed.

The median age for the 260 unemployed RN's was 42 years (Table RN-14), compared to 38 years for full-time RN's, and 38.8 percent of the unemployed RN's were between 25 and 34 years of age. Further tabulations indicated that practically all (97.5 percent) of the 360 licensed RN's not now practicing nursing

Table RN-13

Type of Licensure Action for Registered Nurses Not Employed in Nursing

	Working PT or FT in Other Fields	Unemployed	Retired	Total
New Licensure--Original	1	0	0	1
New License--Endorsement	0	5	0	5
Renewal	52	251	47	350
Reinstatement	0	4	0	4
Totals	53	260	47	360

Table RN-14

Age of Registered Nurses Not Now Employed in Nursing

	Working PT or FT in Other Fields	Unemployed	Retired	Total
Under 20	0	1	3	4
20-24	2	15	0	17
25-29	6	55	0	61
30-34	3	46	0	49
35-39	2	31	1	34
40-44	9	28	0	37
45-49	6	24	0	30
50-54	8	21	2	31
55-59	7	25	5	37
Over 60	10	14	36	60
Totals	53	260	47	360

were Caucasian, and that the majority (77.5 percent) was married. Of the 360 not currently practicing nursing, 245 had completed the diploma program, 69 had an associate degree, 26 had a BA in nursing, and 20 had other degrees.

Additions to supply. As mentioned previously, two institutions within the seven-county area, Morris Harvey College and West Virginia Tech, train registered nurses. Both offer two-year associate degree programs, and together will graduate 103 nurses this year. The age and sex distribution shown in Table RN-15 reveals that a few males are entering the formerly almost exclusively female occupation, and more than half of the graduates are from 20-24 years of age.

In the past, 62.7 percent of the total number of graduates have taken positions in the seven-county area. According to the most recent data available, approximately 83 percent of the Morris Harvey graduates and 41 percent of the West Virginia Tech graduates will remain in the area. The staff at Morris Harvey indicated that more than 90 percent of their graduates had accepted employment as of May 15.

For the following projection, 66 nurses from two area training programs are assumed to be provided to the seven-county supply each year, based on 62.7 percent of 103 graduates entering local practice.

Demand Characteristics

As described in Section I, there are two basic variables which influence the number of persons who should receive training. One is the need for employees because of expansion or growth, and the other is replacement needs because of staff turnover.

During the interviews, the employers gave the AEL team several indications of expected growth, as implied by the interview schedule included in

Appendix B. The number of budgeted positions increased by an average of 5.7 percent each year, and the figures of 5.5 percent for 1973, 6.3 percent for 1974, 5.5 percent for 1975, and 5.5 percent for 1976 are highly consistent.

The 35 employers estimated an increase from 1,056 to 1,187 budgeted positions in two years, and to 1,467 within ten years. These increases of 12.4 percent in two years and 38.9 percent in ten years would indicate a high initial rate of growth, followed by decreasing growth toward the end of the ten-year projection period. Please note that the number of budgeted positions is less than the number of employees reported previously, primarily because a few employers did not report budgeted positions.

When employers were asked to give their opinion regarding increases due to increased services, the median estimate was 10.0 percent in two years, or about five percent each year. The median estimated increase was 12.0 percent for five years and 12.0 percent for ten years. However, one employer whose agency employs about one-third of the total supply estimated increases of 10.0 percent, 20.0 percent, and 30.0 percent over the next two, five, and ten years.

About one-third of the agencies reported vacancies for registered nurses, totaling 70 full-time positions.

One employer said that "There is a demand now--particularly in the nursing homes." Regarding a possible increase, another indicated "Couldn't say, but I'm sure there will be vacancies. All of our nurses will retire within five years." Also to the demand question, another indicated "Couldn't say, but I know that I could leave today and find a job in one of three locations. When you can do that--there's a demand." One person stated that the demand "Probably will have to increase due to government regulations. I don't see how the demand could decrease."

Two other sources were used to select a demand factor for the projection of registered nurses. The Bureau of Labor Statistics has projected a fairly

low nation-wide average annual growth factor of 2.6 percent per year from 1972 through 1985 (78: 48). The Public Health Service projects a 20.6 percent increase in the number of registered nurses from 1980 to 1990 (64: 129). At their projected number of nurses per 100,000 population and assuming a constant seven-county population, the area should employ 1,654 nurses in 1977. The present number of nurses, 1,342, will need to increase by 23.2 percent to meet the national average this year.

The demand rate, or amount of growth due to expansion, selected from the above estimates and projections was a straight-line increase of 6.0 percent per year for the basic projection, and 3.0 percent and 10.0 percent for minimum and maximum projections. The increase due to demand is computed on a base figure of 1,342 nurses employed as of January 1, 1977.

The turnover rate was more difficult to obtain than the projected demand increase. The median rate estimated by 14 employers was 5.0 percent per year. However, the employer of the greatest number of RN's in the area estimated 35 percent and the second largest employer indicated 10 percent. The Health Resources Administration projects that graduate additions will amount to from 7.6% of supply in 1976 to 5.7 percent of supply in 1987 (64: 168). For the projection of registered nurses, an estimated 7.6 percent turnover or effective replacement rate was used.

Training Needs

An effective replacement rate of 7.6 percent per year and increased service rates of 3.0 percent, 6.0 percent, and 10.0 percent were used for the projections shown in Table RN-16. As an illustration of the table, the basic projection indicates that an additional 166 newly-trained registered nurses (1,508-1,342) will be required by 1979, and an additional 454 between now and 1982 in order to meet increased demand.

Table RN-15

1977 Graduates from Registered Nurse Programs in the Seven-County Area, by Age and Sex

Age Categories	Male	Female	Total
Under 20	0	10	10
20-24	3	52	55
25-29	1	17	18
30-34	0	8	8
35-39	0	7	7
40-44	0	5	5
Totals	4	99	103

Table RN-16

Projected Number of Registered Nurses Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	1,342	1,342	1,342				66			
1978	1,476	1,423	1,382	335	282	241	66	269	216	175
1979	1,624	1,508	1,424	369	298	249	66	303	232	183
1980	1,786	1,598	1,466	406	316	256	66	340	250	190
1981	1,965	1,694	1,510	447	336	264	66	381	270	198
1982	2,161	1,796	1,556	491	356	273	66	425	290	207
1983	2,377	1,904	1,602	540	377	279	66	474	311	213
1984	2,615	2,018	1,650	595	400	288	66	529	334	222
1985	2,877	2,139	1,700	654	424	298	66	588	358	232
1986	3,164	2,267	1,751	719	449	306	66	653	383	240
1987	3,481	2,403	1,804	792	476	316	66	726	410	250

*Supply: Total number of persons required in work force each year, based on a 10% (maximum), 6% (basic), and 3% (minimum) increase in demand plus a 15% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

According to the basic projection of Table RN-16, 183 newly-trained nurses will be required in 1978 to meet needs due to increased demand plus replacement. At present, 66 nurses are being trained in the seven-county area and enter the area supply each year, so 117 nurses must be obtained from training sources outside the area or from additional training sources inside the seven-county area. The remainder of the table may be similarly interpreted.

According to the previous discussion (Table RN-11), 40.9 percent of the nurses now working in the seven-county area received their training outside the area, so the figures in the last three columns of Table RN-16 could conceivably be decreased by that amount. The present trend, i.e., the percent of new employees in 1976 trained outside the seven-county area, was not available, but use of that statistic would give a better indication of the number of registered nurses who are from outside the area. Regardless, the basic projection indicates that from 117 to 242 additional newly-trained registered nurses will be required each year from 1978 to 1987 in order to meet growth demands and replace those leaving the profession.

One unknown is the number of part-time and non-practicing RN's who may return to the profession under differing social conditions. Our best advice from the field is that substantial numbers will not return, but there are presently 270 part-time nurses and 260 unemployed nurses now licensed and living in the area. They might be persuaded to help fill the large number of vacancies projected to occur during the next ten years.

As shown by the licensing data (Table RN-12), only about 100 newly-trained registered nurses have been entering the supply each year. This figure would seem to indicate that present area training programs are not quite meeting demands. However, the projected increase due to growth is well in line with the past increases in budgeted positions and increases in demand expected by the employing agencies.

One other factor may tend to reduce the number of trainees required. The projections are based on the present number of full-time and part-time employees. Of the total 1,342, 20.1 percent are part-time nurses and the actual number of hours per week they worked could not be easily determined (Table RN-1).

Given all the assumptions and considerations, the figures reported in Table RN-16 were judged to be the best projection. More definitive data collected in a subsequent year may indicate that the projections are too conservative or liberal, but the table represents the best judgment of the AEL research team.

CERTIFIED/REGISTERED NURSE ANESTHETIST

Occupational Description

Administers intravenous, spinal, and other anesthetics to render persons insensible to pain during surgical operations, deliveries, or other medical and dental procedures. Positions patient and administers prescribed anesthetic in accordance with standardized procedures, regulating flow of gases or injecting fluids intravenously or rectally. Observes patient's reaction during anesthesia, periodically counting pulse and respiration, taking blood pressure, and noting skin color and dilation of pupils. Administers oxygen or initiates other emergency measures to prevent surgical shock, asphyxiation, or other adverse conditions. Informs physician of patient's condition during anesthesia. Records patient's preoperative, operative, and postoperative condition, anesthetic and medications administered, and related data. May give patient postoperative care as directed. (Excerpted from U. S. Department of Labor, Dictionary of Occupational Titles [79: 493].)

A certified registered nurse anesthetist must be a graduate from an accredited school of nursing plus graduation from an accredited school of nurse anesthesiology. Most programs are 24 months in duration. The individual must be certified as a registered nurse and as a registered nurse anesthetist in the state where they are working. Some work experience as a registered nurse is required for admission to many of the accredited schools of nurse anesthesiology.

Sources of Data

There were two primary local sources of data concerning certified registered nurse anesthetists. Representatives from 11 agencies which employ CRNA's responded to the questions in the interview schedule included in Appendix B, and a representative of the one CRNA training program in the seven-county area provided information concerning recent graduates.

The CRNA training program is operated by the Charleston Area Medical Center, and has been accredited for four years. They graduated 17 CRNA's in 1976, and graduates are usually employed in hospitals or dentists' offices.

The employer of the greatest number of CRNA's is the Charleston Area Medical Center with approximately half of the seven-county supply.

Supply Characteristics

The 11 employers indicated that there are presently 68 full-time equivalent certified registered nurse anesthetists working in the seven-county area, of which two are male, 27 are female, and the sex of 39 was not reported. The current supply is therefore 68. However, there is some evidence that not all reported were in fact certified.

As shown by Table CRNA-1, the program at CAMC provided 17 graduates, or additions to current supply, in 1977. Historically, 76.5 percent of the graduates remain in the seven-county area and accept local employment, so 13 CRNA's may be expected to enter the local labor supply.

Demand Characteristics

Any indication of expected increase or decrease in the demand for CRNA's over the next ten years had to be inferred from locally obtained data. Neither the Bureau of Labor Statistics nor the Health Resources Administration provided

Table CRNA-1

1977 Certified RN Anesthetist Graduates
by Age and Sex

Age Categories	Male	Female	Total
Under 20	0	0	0
20-24	1	2	3
25-29	3	5	8
30-34	2	1	3
35-39	0	1	1
40-44	0	2	2
45 and over	0	0	0
Totals	6	11	17

projections of employment opportunities for CRNA's, as they did with most other occupations. Since CRNA's are not licensed in West Virginia, no data were available from licensure sources, as was the case with registered nurses.

The 11 employers of CRNA's in the seven-county area were asked to indicate the number of CRNA positions budgeted each of the past five years, from 1973 to 1977. The mean increase in estimated budgeted positions per year was 7.5 percent, and the increases for each year were 0.0 percent for 1973 (January 1, 1973 to December 31, 1973), 91. percent for 1974, 7.6 percent for 1975, and 13.3 percent for 1976.

The employers were asked to estimate the budgeted number of positions in two, five, and ten years. They responded with estimates equal to increases of 22.0 percent of the 1977 budgeted number for two years or 1979, 35.3 percent for five years, and 50.0 percent for ten years. They were also asked to indicate the number of CRNA's required to "provide optimum health services for your clients." They responded with a number equal to 14.7 percent greater than the present supply.

Finally, the employers were asked to estimate the employment opportunities in two, five, and ten years. More than half of them indicated a steady ten percent increase.

The selected rate of increase due to demand or growth was influenced by the above information, as well as by trends for other occupations. The basic projection rate for CRNA's is 7.5 percent, the historical increase in budgeted positions. The maximum rate selected for the projection is 11.0 percent, or approximately the annual rate suggested by the future budget estimates. The minimum increase rate is arbitrarily 3.7 percent, half the basic rate.

Most of the employers reported a zero turnover rate, so the projected rate should be rather low, lower than for nurses. For the projection, the

effective replacement rate is 6.0 percent. That is the percent of employed CRNA's which must be replaced each year by newly trained individuals, and does not include changes of employment within the area or re-entry into service by those with previous training.

The CRNA projection is therefore based on (1) an effective replacement rate of 6.0 percent, (2) an annual addition of 13 graduates from local sources, and (3) a rate of 11.0 percent, 7.5 percent, and 3.7 percent for maximum, basic, and minimum increases in supply each year due to additional demand or growth.

Training Requirements

As indicated by Table CRNA-2 and according to the basic projection, the number of certified RN anesthetists required in two, five, and ten years is 79, 98, and 140, in 1979, 1982, and 1987. The ten-year increase over current supply is 205 percent, or more than twice the number presently working in the seven-county area.

According to the basic projection, the number of graduates remaining in the seven-county area will be slightly more than required for 1978 through 1982. For example, 13 CRNA graduates are assumed to enter local supply in 1978, which is four more than the number of graduates needed to enter local supply. As shown by Table CRNA-2, the requirements for newly trained graduates will become balanced by 1983, when the supply of newly trained graduates equals the demand for them.

Informal comments by health planners indicate that the demand will be much higher than that projected here, perhaps even higher than the maximum projection. These projections are based on past budget trends, estimates of the future number of CRNA's as submitted by personnel offices and other representatives of the employing institutions, and on national employment projections.

The experience of another year or two of data collection and selection of most accurate indicators of future growth would be most helpful, and especially with certified registered nurse anesthetists.

Table CRNA-2

Projected Number of Certified RN Anesthetists Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	68	68	68				13			
1978	75	73	71	11	9	7	13	-2	-4	-6
1979	84	79	73	14	10	6	13	1	-3	-7
1980	93	84	76	14	10	7	13	1	-3	-6
1981	103	91	79	16	12	8	13	3	-1	-5
1982	115	98	82	18	12	8	13	5	-1	-5
1983	127	105	85	19	13	8	13	6	0	-5
1984	141	113	88	22	14	8	13	9	1	-5
1985	157	121	91	24	15	8	13	11	2	-5
1986	174	130	94	26	16	8	13	13	3	-5
1987	193	140	98	29	18	10	13	16	5	-5

*Supply: Total number of persons required in work force each year, based on an 11.0% (maximum), a 7.5% (basic), and a 3.7% (minimum) increase in demand plus a 6.0% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

LICENSED PRACTICAL NURSE

Occupational Description

Licensed practical nurses help care for the physically or mentally ill and infirm. Under the direction of physicians and registered nurses, they provide nursing care that requires technical knowledge but not the professional training of a registered nurse.

In hospitals, licensed practical nurses provide much of the bedside care needed by patients. They take and record temperatures and blood pressures, change dressings, administer certain prescribed medicines, and help bed patients with bathing and other personal hygiene. They assist physicians and registered nurses in examining patients and in carrying out nursing procedures. They also assist in the delivery, care, and feeding of infants, and help registered nurses in recovery rooms by reporting any adverse changes in patients. Some licensed practical nurses help supervise hospital attendants.

Licensed practical nurses who work in private homes provide mainly day-to-day patient care that seldom involves highly technical procedures or complicated equipment. In addition to providing nursing care, they may prepare meals and care for the patient's comfort and morale. They also teach family members how to perform simple nursing tasks.

In doctors' offices and in clinics, licensed practical nurses prepare patients for examination and treatment. They also may make appointments and record information about patients.

All states and the District of Columbia regulate the preparation and licensing of practical nurses. To be licensed, students must complete a course of instruction in practical nursing that has been approved by the State board of nursing and pass an examination.

Practical nurse training programs are generally 1 year long and include both classroom study and clinical practice. Classroom instruction covers nursing concepts and principles and related subjects including anatomy, physiology, medical-surgical nursing, administration of drugs, nutrition, first aid, and community health. Students learn to apply their skill to an actual nursing situation through supervised hospital work. (Excerpted from U. S. Department of Labor, Occupational Outlook Handbook, 1976-77 Edition [76: 472-473].)

Sources of Data

The data concerning the number of licensed practical nurses came from two primary sources. Employing agencies listed in Appendix A were contacted and requested to reveal the number of LPN's currently employed, as indicated by the interview schedule included in Appendix B. Twenty-six of the agencies indicated employment of LPN's.

The second source was from the licensure forms processed by the State Department of Health. Permission was obtained from the State Board of Examiners for Licensed Practical Nurses to use the 1977 data, but unfortunately, the results could not be made available until August, 1977. As a result, AEL staff manually screened all licensure forms available as of May 24, 1977, for LPN's located in the seven-county area. The May cut-off date was necessary so that this report could be prepared by June 15. Certain data were tabulated and are reported in this section. State Department of Health staff indicated that AEL examined 3,534 forms from the entire state, that 5,825 forms were sent out, and that that number will probably be returned. Therefore, the tabulated data are weighted by a factor of 1.65 in order to obtain estimates of the actual statistics for the seven-county area. Much more data than those reported should be available for subsequent years, since the data are regarded by State Department of Health personnel to be of superior quality this year, and computer processed tabulations will be available after or during August.

The data concerning additions to supply were obtained from the three training institutions in the area; the Arch A. Moore Vocational School in Jackson County, the Fayette County Vocational School of Practical Nursing, and the Garnet Career Center in Charleston.

Supply Characteristics

As shown by Table LPN-1, there are presently an estimated 769 full-time LPN's working in the seven-county area, according to State Department of Health records. This figure compares favorably with the figure of 701 LPN's obtained from the employer survey. The first figure is used in these projections. The licensure data were considered more accurate since the AEL survey did not include private physicians' offices.

The distribution of LPN's according to ages was fairly even (Table LPN-1). They remain in practice for longer periods than registered nurses, or perhaps some tend to be older when they begin practicing. The median age for LPN's is 48.3 years, compared to 38 for registered nurses. In the seven-county area, 43.7 percent of the practicing LPN's are 50 years of age or older, and more than one in six are 60 years old or older. These age data would seem to indicate a fairly high future turnover rate.

Seventy-nine LPN's have been practicing one year or less (Table LPN-2), and there were apparently about 50 LPN's per year added to the supply for the previous nine years. There are only about seven male LPN's according to State Department of Health data, and the employers surveyed by AEL reported 4.5 full-time equivalent males.

A substantial majority of LPN's (74.0 percent) were employed in "Other Non-Governmental Employment," which means area hospitals (Table LPN-4). Much smaller numbers of LPN's were employed by a group health facility (7.9 percent), self-employed or on private duty (4.7 percent), or an employee of a doctor (4.5 percent).

According to Table LPN-5, 87 persons were trained as LPN's within the area during 1976-77, and 69 of these, or 78.9 percent, are expected to remain in the seven-county area. There were four males graduated.

Table LPN-1

Tabulated and Estimated Number of Full-Time LPN's Employed in Seven-County Area, by Age

Age Category	Actual Number	Estimated* Number	Percent
Under 20	0	0	
20-24	28	46	6.0
24-29	43	71	9.2
30-34	29	48	6.2
35-39	33	54	7.0
40-44	41	68	8.8
45-49	89	146	19.0
50-54	61	101	13.1
55-59	67	111	14.4
60 or over	75	124	16.1
Totals	466	769	100.0

*Based on hand tabulation of 60.7% of the state licensure forms.

Table LPN-2

Years Which LPN's Have Been Active

	Actual Number	Estimated Number	Percent
1 year	48	79	10.3
2 years	24	40	5.2
3-5 years	92	152	19.8
6-10 years	160	263	34.2
11-20 years	127	210	27.3
21 years +	15	25	3.2
Totals	466	769	100.0

Table LPN-3

Distribution of Full-Time LPN's by Sex

	Actual Number	Estimated Number	Percent
Male	4	7	.9
Female	462	762	99.1
Totals	466	769	100.0

Table LPN-4

Form of Employment for Licensed Practical Nurses

	Actual Number	Estimated Number	Percent
Self-Employed or Private Duty	22	36	4.7
Employee of Doctor (MD, DO, DDS)	21	35	4.5
Employee of Retail or Wholesale Trade Establishment	0	0	
Employee of Group Health Facility	37	61	7.9
Employee of Partnership or Group of Doctors	13	21	2.8
Employee of Other Non-governmental Employment	345	569	74.0
Employee of Local Government	1	2	0.2
Employee of County Government	2	3	0.4
Employee of State Government	15	25	3.2
Employee of Federal Government (Civilian employee)	1	2	0.2
Employee of Federal Government (uniformed services)	0	0	
Voluntary Worker (unpaid)	1	2	0.2
Other	8	13	1.7
Totals	466	769	100.0

Table LPN-5

1977 Graduates from Licensed Practical Nurse Programs in the Seven-County Area, by Age and Sex

Age Categories	Male	Female	Total
Under 20		11	11
20-24		26	26
25-29	3	12	15
30-34	1	8	9
35-39		8	8
40-44		6	6
45-49		9	9
50-54		3	3
Totals	4	83	87

The following projections are based on the assumption that 69 LPN's will continue to be trained and enter employment in the area, and that there are currently 769 LPN's employed in the area.

Demand Characteristics

As with other occupations, the LPN employers were requested to estimate the demand characteristics through different means. Twenty-six employers responded to the interview schedule included in Appendix B.

The increase in budgeted positions for LPN's has increased by an average of 4.2 percent per year over the past five years. The increases were 4.3 percent in 1973, 2.4 percent in 1974, 5.0 percent in 1975, and 5.2 percent in 1976. There were a total of 81 vacancies reported at the time of the interview.

The employers were asked to estimate the number of budgeted positions in two, five, and ten years. The resulting percent increase over the present budgeted number was 9.8 percent, 3.2 percent, and 4.5 percent respectively. One hospital reported decreasing use of LPN's. When asked what number of LPN's would be required to provide optimum health services, the resulting number was 909, which was 21.8 percent above the present budget number.

The employers were asked to estimate the increase or decrease in the number of LPN's required in the area, for the next two, five, and ten years. The median was 9.0 percent, 9.0 percent, and 11.7% increase respectively.

The Health Resources Administration projects a 41.5 percent increase in the number of LPN's between 1970 and 1980, and a 44.9 percent increase between 1980 and 1990 (64: 143). The Bureau of Labor Statistics projects a 96.0 percent increase between 1972 and 1985, and an average annual increase of 5.3 percent per year. According to the Health Resources Administration projections, 931 LPN's would be required to meet national norms. This requires an increase of 162 or 21.0 percent over the 769 LPN's now employed in the seven-county area.

In the case of the LPN's, a 5.0 percent growth rate appeared to best fit the most accurate data. The figure is slightly less than the 5.3 percent projected increase by the Bureau of Labor Statistics, and slightly more than the employer's past budgeted increases. The maximum growth was judged to be 8.0 percent since none of the employers foresaw large gains, and the minimum growth rate was 2.0 percent, since many of the employers thought there would be little increase in the number of LPN's.

The turnover rate indicated by the employers ranged up to 40.0 percent, and the median was 6.0 percent, which seems low. A newly-employed LPN would average working almost 17 years at that rate. The employer of the largest number of LPN's, which was 30.0 percent of the total, reported a 24.0 percent turnover rate, and the second largest employer reported a 7.0 percent rate. An 8.0 percent effective rate was selected as representative of the number of newly-trained LPN's which would have to replace those leaving their positions and not becoming employed again in the seven-county area.

At the national level, the number of graduates required to replace current supply plus demand is about 12.6 percent of current supply. For example, the Health Resources Administration projects 482,078 LPN's in 1977, and 60,701 additions from graduates of approved programs (64: 180). AEL's basic projected increase for LPN's is 5.0 percent due to growth plus an 8.0 percent replacement rate due to turnover and hiring of newly-trained LPN's.

Training Need

According to the basic projection procedure just described, 848 LPN's will be required by 1979, 981 by 1982, and 1,253 by 1987, or an increase of 62.9 percent over ten years (Table LPN-6). A maximum increase of 117 percent and minimum increase of 21.8 percent is projected for the ten-year period.

According to the basic projection and by way of illustration, 106 LPN's will be required in 1979 to replenish the supply and meet increased demand, 121 will be needed in 1982, and 155 in 1987. Since 69 are now trained locally and are assumed to enter the local supply annually, an additional 37 LPN's will be needed in 1979, 52 in 1982, and 86 in 1987. These persons must be recruited from training programs outside the seven-county area or taken from additional training programs within the area. If new training programs are planned, past performance has indicated that about 80 percent of the graduates will enter the local supply. Therefore, the planned number to be trained should be somewhat larger than the needed newly-trained LPN's.

Table LPN-6

Projected Number of Licensed Practical Nurses Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	769	769	769				69			
1978	831	807	784	124	100	77	69	55	31	8
1979	897	848	800	132	106	79	69	63	37	10
1980	969	890	816	144	110	80	69	75	41	11
1981	1,046	935	832	155	116	81	69	86	47	12
1982	1,130	981	849	168	121	84	69	99	52	15
1983	1,220	1,031	866	180	128	85	69	111	59	16
1984	1,318	1,082	883	196	133	86	69	127	64	17
1985	1,423	1,136	901	210	141	89	69	141	72	20
1986	1,537	1,193	919	228	148	90	69	159	79	21
1987	1,660	1,253	937	246	155	92	69	177	86	23

*Supply: Total number of persons required in work force each year, based on an 8% (maximum), 5% (basic), and 2% (minimum) increase in demand plus an 8% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

OPERATING ROOM TECHNICIAN

Occupational Description

Operating room technicians function in association with nurses and surgeons to help provide the best possible care to the surgical patient. The technician is a part of the operating room team responsible for the cleanliness, safety and efficiency of the operating room that leads to good patient care. His knowledge of and experience with aseptic surgical technique qualify him to prepare materials for use at the operating table and to assist in the use of these materials. The operating room technician should have the essential qualities of intelligence, the ability to relate to people, and orientation towards service to people and a capacity for calm and reasoned judgment in meeting emergencies. Respect for the patient as a person and respect for the patient's privacy are expected of the technician.

The operating room technician may become highly trained and specialized in the areas in which he is adept and in which he has had specific experience and interest. He may be required to be knowledgeable in a very wide variety of operative procedures or he may be asked, or he may request to be allowed to concentrate in certain highly specialized areas of operating room surgery. The frequency of performance of certain duties will, in part determine the degree of special expertise such an individual obtains in the care of patients in the operating room. Since no one individual can participate in all categories of work outlined, a certain degree of limitation may be expected. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 355].)

Some operating room technicians are trained on the job. The length of the on-the-job training programs varies from six weeks to one year, depending on the trainee's qualifications and program's objectives. Some hospitals prefer applicants who have worked as nursing aides or practical nurses.

Some training programs are conducted by vocational and technical schools and community and junior colleges. Most of these programs last from nine months to one year. Some are two years in length and lead to an associate degree.

The Association of Operating Room Technicians awards a certificate to operating room technicians who pass their comprehensive examination. A Certified Operating Room Technician (CORT) is recognized as one with broad general knowledge and the ability to apply it properly.

Sources of Data

The local data concerning operating room technicians were obtained from the ten agencies which employ ORT's and the one training program within the area. The data were obtained by interview, and the employer interview schedule is included in Appendix B. The training agency is Garnet Career Center, which started training operating room technicians in 1975. The ten employing agencies are hospitals within the seven-county area.

Supply Characteristics

The AEL survey indicated that there are 71 operating room technicians employed with the ten agencies. Two are male, 30 are female, and data were not available for the other 39. One employer, Charleston Area Medical Center, employes more than half of the ORT's. The projection is somewhat confounded by the fact that most hospitals do not require an operating room technician to be certified. Since informal reports indicate that less than one-fifth are officially certified, the AEL survey team included all persons reported to be working as an ORT in the current and projected supply. Some hospitals recognize certification by making a slight pay differential.

The training program offered by Garnet Career Center is a one-year program. Nine females will be graduated in November of this year. Four of the nine graduates were 20-24 years of age, three were 25-29, one was 30-34, and one was 35-39 years of age. Of last year's graduating class of 12 ORT's, nine or 75 percent remained in the seven-county area.

Demand Characteristics

Demand characteristics for occupations with very small numbers of employees may fluctuate widely and are therefore hazardous to project. For

example, a "normal" increase of ten percent is only seven persons, but changes in responsibility given to ORT's may be responsible for a demand for twice the present number, or half the present number within two or three years. The following local demand characteristics are based on information provided by the ten employing agencies.

None of the agencies reported vacancies, which would indicate that present demand has been met. The average increase in budgeted positions has been 9.2 percent, based on increases of 4.5 percent in 1973, 13.0 percent in 1974, 11.6 percent in 1975, and 7.5 percent in 1976. When asked to estimate the number of budgeted positions in two, five, and ten years, the employer representatives responded with numbers indicating increases of 13.9 percent, 18.0 percent, and 22.0 percent over the present budgeted number for the three time periods. When asked how many ORT's would now be required to provide optimum health services, they responded with a number only 4.8 percent greater than the number presently employed.

The median expected increase in demand due to growth was approximately ten percent for two, five, and ten years, and none reported an expected decrease. The employers apparently had too little experience with recruiting ORT's, and too few ORT's had been employed to give replacement rates that were meaningful for larger groups. Rates ranged from 0.0 percent to 100.0 percent.

Neither the Bureau of Labor Statistics nor the Health Resources Administration report projected data concerning ORT's, so there is little guidance from national sources available for selection of demand and replacement rates. Lacking these sources, a basic annual demand increase of 9.2 percent is projected. This is the average budgeted increase over the past five years, is in line with other projections, but is more than the number expected by employers according to their estimated budgeted numbers. For example, an

increase of 13.9 percent in two years would be at a rate of less than 7.0 percent per year. Maximum and minimal projection rates were somewhat arbibrarily placed at plus and minus 5.0 percent of the basic projection.

The selected effective replacement rate, i.e., the number of new trainees required to replace existing supply, was 8.0 percent, the same as for licensed practical nurses. Therefore, the ORT projections are based on a current supply of 71, on 8.0 percent of the current supply leaving their present job and being replaced by newly-trained ORT's, and on growth increases through demand of 14.2 percent, 9.2 percent, and 4.2 percent for maximum, basic, and minimum projections.

Training Needs

According to the previously described assumptions, the basic projection indicates that a supply of 85 operating room technicians will be required two years from now, 110 by 1982, and 171 by 1987. The increase over present supply is 19.7 percent in two years (from 71 to 85), 54.9 percent in five years, and 140.8 percent in ten years (Table ORT-1).

At that rate, and again according to the basic projection, 13 additional newly-trained ORT's will be needed in 1978, 13 in 1979, and up to 27 in 1987. Assuming that nine newly-trained ORT's continue to enter the supply from training sources in the seven-county area, between four in 1978 and seventeen in 1987 will need to be recruited from outside the region or provided by additional local training.

Table ORT-1

Projected Number of Operating Room Technicians Required
to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	71	71	71				9			
1978	81	78	74	16	13	9	9	7	4	0
1979	93	85	77	18	13	9	9	9	4	0
1980	106	92	80	20	14	9	9	11	5	0
1981	121	101	84	23	16	9	9	14	7	0
1982	138	110	87	27	17	10	9	18	8	1
1983	157	120	91	30	19	11	9	21	10	2
1984	180	131	95	36	21	11	9	27	12	2
1985	205	144	99	39	23	12	9	30	14	3
1986	235	157	103	46	25	12	9	37	16	3
1987	268	171	107	52	27	12	9	43	18	3

*Supply: Total number of persons required in work force each year, based on a 14.2% (maximum), 9.2% (basic), and 4.2% (minimum) increase in demand plus an 8% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

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RADIOLOGIC TECHNOLOGIST

Occupational Description

Working under the supervision of a physician, the radiologic technologist is concerned with the proper operation of x-ray equipment and preparation of patients for various types of diagnostic procedures. Upon the request of the physician, the radiologic technologist exposes x-ray films to produce radiographs of internal parts of the body. These radiographs may reveal possible evidence of disease, injury, or other significant medical information.

The radiologic technologist adjusts x-ray equipment to correct settings for each examination, positions the patient, and determines proper voltage, current, and desired exposure time for each radiography. He is also responsible for maintaining equipment in proper working order. He may process the film and share responsibility for maintaining patient records. The radiologic technologist assists the radiologist in preparation of radio-opaque mixtures which are administered to the patient so that internal organs may be clearly identified on the exposed x-ray film. Although the x-ray examination is usually completed at the hospital or office of the radiologist or other physician, the technologist may be required to operate mobile x-ray equipment at the patient's bedside or in the operating room.

Radiologic technologists must be in good health, emotially stable, accurate, thorough, and enjoy working with people. The radiologic technologist's duties often include assisting patients who are acutely ill or seriously injured. Consequently, he should be endowed with qualities of empathy and compassion toward the sick and disabled.

The prerequisites for admission to an approved program in radiologic technology include graduation from high school or certification of equivalent education. Courses in physics, chemistry, biology, algebra, geometry, and typing are strongly recommended. The educational program in radiologic technology must be at least 24 months in length. The curriculum includes anatomy and physiology, physics, medical terminology, dark room chemistry and technique, principles of radiographic exposure, radiographic positioning, radiographic procedures, radiation protection, radiation therapy, nuclear medicine technology, film critique, and professional ethics.

Individuals successfully completing AMA-approved educational programs in radiologic technology may apply as candidates for certification by the American Registry of Radiologic Technologists. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 410-411].)

Sources of Data

The source of local data for radiologic technologists was the 20 local employing agencies and the two training agencies. The interview schedule included in Appendix B was used to interview employers, and a list of all employers contacted in the seven-county area is included as Appendix A.

Data were obtained from the two local training agencies by telephone. Most of the radiologic technologists were trained in the two-year associate degree program at Morris Harvey College. That program began in June of 1973, and has enrolled slightly under 30 persons each year. A few are enrolled in a hospital program at St. Francis Hospital, and are also included in the projections.

The data are not regarded to be as complete as those supplied through licensing processes, but additional data will probably be available when the licensure process is implemented. The information obtained in this survey included data for those who would be qualified for licensure as radiologic technologists under the new state law as well as those who are now registered radiologic technologists.

Supply Characteristics

The 20 employing agencies reported a total of 105.5 full-time equivalent radiologic technologists. Fourteen were male, 42.5 FTE were female, and the sex was not indicated for 49 persons. The rounded figure of 106 was used for current supply.

As indicated by Table RRT-1, 21 radiologic technologists are expected to graduate this year. Three are male and eighteen (85.7 percent) are female, and all graduates are between 20 and 34 years of age. Experience indicates that 92.9 percent became employed in the seven-county area, so 20 persons are assumed to continue entering the supply each year at the current rate.

Table RRT-1

1977 Radiologic Technologist Graduates
by Age and Sex

Age Categories	Male	Female	Total
Under 20	0	0	0
20-24	2	17	19
25-29	0	1	1
30-34	1	0	1
35 and over	0	0	0
Totals	3	18	21

According to a national survey conducted in 1975 by the American Society of Radiologic Technologists, 58.3 percent of the "radiation therapy technologists" are under 30 years of age and more than half of them have been practicing five years or less (8: 1).

Demand Characteristics

Several factors, and some of them unique to the occupation, affect projected demand for radiologic technologists.

The historical budgeted number of radiologic technologists has increased by a mean 10.9 percent per year for the past five years. The increase in 1973 was 2.6 percent, 18.2 percent in 1974, 11.0 percent in 1975, and 11.9 percent in 1976. For the next two years, the employers estimate an increase of 20.4 percent in the number of radiologic technologists, a 25.1 percent increase in five years, and a 53.8 percent increase in ten years.

Seven of nineteen employers who answered the question reported vacancies, and for sixteen positions. The number required to provide optimum health services to current clients was 121.5, or a 15.2 percent greater number of radiologic technologists than are now employed in the seven-county area. The employers estimated an increase at a median rate of 11.0 percent for two years, 11.0 percent for five years, and 10.0 percent for ten years.

The Bureau of Labor Statistics projects that the number of employed radiologic technologists will increase by 58.0 percent between 1972 and 1985. or at a rate of 3.6 percent per year (78: 48). The Health Resources Administration indicates that the number will increase by 128.2 percent between 1970 and 1980, and by 72.4 percent between 1980 and 1990 (64: 143). By using their data, the current supply of radiologic technologists in the seven-county area should be 114, or 8.0 percent greater than actual supply (64: 184).

The projected rate of growth due to increased demand was 10.9 percent, the figure derived by past increases in numbers of employees. This rate is a little larger than the nationally projected changes, but the seven-county area is already behind the national per capita number of radiologic technologists. Four percent plus and minus the basic projection were selected as maximum and minimum projected rates.

Another factor which will influence local demand for radiologic technologists is recent legislation. On April 8, 1977, the West Virginia Legislature passed Senate Bill No. 483 which will require the licensing of all persons engaged in the practice of radiologic technology in West Virginia. (See Appendix C for complete copy of the Bill.)

The declaration of public policy states:

> The Legislature finds and declares that in the interest of public health, the people of this state should be protected from excessive and improper exposure to ionizing radiation. It is the purpose of this article to establish minimum standards of education, training and experience for radiologic technologists and to prescribe means for assuring that these standards are met.

Qualifications include completion of a minimum 24-month course in radiologic study in a school of radiologic technology approved by the board and passing the examination prescribed by the board. Individuals who have been engaged as radiologic technologists in the state for a stated period of time, prior to the effective date of the new law, may not be required to obtain a license in accordance with the provisions of Article 23. This legislation will most likely increase the demand for registered radiologic technologists.

Again, the effective turnover or replacement rate is problematic. Ten of fifteen employers reported zero turnover, but the agency which employs almost one-half of the radiologic technologists reported a 57 percent turnover rate. Presumably, many of those positions are filled by persons with some experience since some unknown fraction of the total turnover is created by

people changing locations, and who therefore do not have to be trained. Nationally, the newly-trained graduates are expected to make up about 14.0 percent of current supply (64: 184), so this rate was used as the projected percent of new graduates to meet replacement needs each year.

The rates used in the following projections, therefore, were 14.0 percent for replacement of supply by newly-trained technologists and 6.9 percent, 10.9 percent, and 14.9 percent for minimum, basic, and maximum demand increases.

Training Needs

The basic projection shown in Table RRT-2 indicated a ten-year increase in registered radiologic technologists of from 106 to 298, or 181.1 percent, which is somewhat more than the Health Resources Administration projected increase of 128.2 percent for a ten-year period. The increase for the next two years is 22.6 percent, which is only slightly more than that estimated by the employers.

According to the projection, 27 persons will be required to replace those leaving employment and meet expected growth, and 20 of these will be provided by local training programs. An additional seven persons will need to be trained locally or recruited from outside the seven-county area. The remainder of Table RRT-2 may be interpreted similarly.

Table RRT-2

Projected Number of Registered Radiologic Technologists Required
to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	106	106	106				20			
1978	122	118	113	31	27	22	20	11	7	2
1979	140	130	121	35	29	24	20	15	9	4
1980	161	145	129	41	33	25	20	21	13	5
1981	185	160	138	47	35	27	20	27	15	7
1982	212	178	148	53	40	29	20	33	20	9
1983	244	197	158	62	44	31	20	42	24	11
1984	280	219	169	70	50	33	20	50	30	13
1985	322	243	181	81	55	36	20	61	35	16
1986	370	269	193	93	60	38	20	73	40	18
1987	425	298	207	107	67	41	20	87	47	21

*Supply: Total number of persons required in work force each year, based on a 14.9% (maximum), 10.9% (basic), and 6.9% (minimum) increase in demand plus a 14.0% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

CYTOTECHNOLOGIST

Occupational Description

The cytotechnologist is a trained medical laboratory technologist who works with the pathologist. The main responsibility of the cytotechnologist is to detect evidence of cell disease by the microscopic study of cell examples. These cellular samples are obtained from various sites, such as the female reproductive tract, the oral cavity and any body cavity shedding cells.

The cytotechnologist then prepares the cellular samples by special staining techniques. Using the microscope, the cytotechnologist is able to detect minute abnormalities of the cell. These minute abnormalities may be the first warning signs of cancer. It is through the findings of the cytotechnologist that the physician is frequently able to diagnose cancer long before it could be detected by other methods. Diseases involving hormonal abnormalities may also be detected by cytologic methods.

The cytotechnologist should have a strong interest in the biologic sciences and be able to work with concentration for extended periods of time. Most cytotechnologists work in hospitals or private laboratories. Some prefer teaching or research to diagnostic work, but there are many opportunities for the well-trained student.

The Council on Medical Education of the American Medical Association and the American Society of Cytology collaborate in determining and maintaining minimal standards, termed Essentials, for educational programs for cytotechnologists. The Council on Medical Education grants formal approval to educational programs which meet or exceed the Essentials.

Prior to acceptance into an AMA-accredited educational program for cytotechnologists, the applicant is required to have completed two years of work in an accredited college or university. The collegiate work should be concentrated in the area of biological sciences. Also, eligibility for admission to a cytotechnologist educational program may be satisfied if the applicant is a registered medical technologist (ASCP), or possesses a baccalaureate degree from an accredited college or university.

The specific training in cytotechnology is twelve months in length. The curriculum includes the historical background of cytology, cytology as applied in clinical medicine, cytology in the screening of exfoliative tumor cells, as well as areas of anatomy, histology, embryology, cytochemistry, cytophysiology, endocrinology, and inflammatory diseases.

Those persons satisfactorily completing an AMA-accredited educational program for cytotechnologists are eligible to take the certifying examination given by the Board of Registry of the American Society of Clinical Pathologists. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 237].)

Sources of Data

The local source of data concerning cytotechnologists was the one hospital training progarm at Charleston Area Medical Center, and the three agencies in which the cytotechnologists were found to be employed. Interview schedules are included in Appendix B, but more dependence had to be placed on national ratios than on local trends.

Supply Characteristics

The three agencies reporting employment of cytotechnologists were the Charleston Area Medical Center, Montgomery General Hospital, and the State Department of Health. The total of seven in current supply is used as a basis for the following projections. As for additions to the supply, three graduates are expected this year from the training program operated by Charleston Area Medical Center. They have a 12-month hospital program, and require that each person entering the program have at least 60 hours of college credit, some of which must be in the field of science. In 1974, three persons graduated from the program, six persons completed the program in 1975, and six persons were graduated in 1976. None of the 1976 graduating class became employed in the seven-county area, so an estimate of average numbers of local graduates entering local employment was assumed to be zero.

Demand Characteristics

One of the employer representatives foresaw little increase in the number of cytotechnologists, perhaps from two to three at his institution. Another thought there might be a 20 percent increase each year during the next ten years. None of them reported employing a cytotechnologist prior to 1975, although the data were not too complete.

At the national level, the Bureau of Labor Statistics does not project trends for cytotechnologists, but the Health Resources Administration indicates an increase of 94.6 percent between 1970 and 1980, and an increase of 58.5 percent between 1980 and 1990 (64: 143).

According to the national average, there should be six cytotechnologists to serve the population of the seven-county area, and that was the number reported in the survey. The occupation therefore appears to be highly specialized, and the future demand is not too great in terms of total numbers.

For the following projections, an effective turnover rate of 10.0 percent was used, and the basic projection is based on a relatively low 5.0 percent increase due to growth. The minimum rate is 0.0 percent, the rate indicated by one employer, and the maximum is 10.0 percent.

Table C-1

Projected Number of Cytotechnologists Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	6	6	6				0			
1978	7	6	6	2	1	1	0	2	1	1
1979	7	7	6	1	2	1	0	1	2	1
1980	8	7	6	2	1	1	0	2	1	1
1981	9	7	6	2	1	1	0	2	1	1
1982	10	8	6	2	2	1	0	2	2	1
1983	11	8	6	2	1	1	0	2	1	1
1984	12	3	6	2	1	1	0	2	1	1
1985	13	9	6	2	2	1	0	2	2	1
1986	14	9	6	2	1	1	0	2	1	1
1987	16	10	6	3	2	1	0	3	2	1

*Supply: Total number of persons required in work force each year, based on a 10% (maximum), 5% (Basic), and 0% (minimum) increase in demand plus a 10% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

MEDICAL LABORATORY TECHNICIAN

Occupational Description

The medical laboratory technician performs clinical laboratory tests under appropriate laboratory supervision for the purpose of developing data which may be utilized by a qualified physician for the determination of the presence and extent of disease as well as implications pertaining to the cause of disease.

Medical laboratory technician programs are conducted in junior or community colleges, two-year divisions of universities and colleges, or in other recognized institutions granting associate degrees. The period of education and training is usually two academic years in duration and results in the granting of an associate degree to the successful student. Medical laboratory facilities utilized for instruction are under qualified pathologist and technologist supervision, and the program of instruction is developed in collaboration with them.

The laboratory instruction includes courses in the teaching laboratory and instruction in the clinical laboratory. Courses may be taught in a teaching laboratory on the college campus, in an affiliated hospital, or in both facilities focusing upon basic skills, the understanding of principles and the mastering of the procedures of laboratory testing.

The Council on Medical Education of the American Medical Association in collaboration with the American Society of Clinical Pathologists and the American Society for Medical Technology reviews and accredits educational programs for the training of medical laboratory technicians. Admission to an AMA-accredited program in this clinical laboratory category requires that the applicant meet the admission requirements established by the sponsoring educational institution.

The clinical training program includes basic principles commonly utilized in the diagnostic laboratory with technical instruction pertaining to procedures in hematology, serology, chemistry, microbiology and other areas pertinent to the total function and scope of medical laboratory technicians in the clinical laboratory. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 235].)

Sources of Data

Local data for medical laboratory technicians came from the 17 agencies which employ them through use of the interview schedule included in Appendix B, and from the staff of the one training program located in the seven-county area.

The data collected are fairly complete, but considerable uncertainty is introduced by the confusion in terminology and the number of agencies certifying medical laboratory personnel. The employers themselves were found to be using different interpretations. They were asked to respond according to the definition given on the interveiw schedule; namely, that a medical laboratory technician has an associate degree plus certification or registry.

Supply Characteristics

The 17 employers reported that there are currently 41 medical laboratory technicians employed in the seven-county area. Of the 41, 36.5 FTE were female, 1.5 were male, and the sex of three persons was not reported. The employing agency reporting the greatest number was Thomas Memorial Hospital.

Morris Harvey College operates the one training program or source of supply in the seven-county area. Their two-year program began in 1975 with 18 students, and they will graduate 10 in 1977 as indicated by Table MLT-1. Their attrition rate from enrollment to graduation was therefore 44.4 percent. Based on the first class, 90.0 percent of the graduates remain and are employed in the seven-county area.

Demand Characteristics

The general comments by employers seemed to indicate that the demand for medical laboratory technicians would not increase, but the data they gave appeared to indicate some increase as explained below.

Table MLT-1

1977 Medical Laboratory Technician Graduates
by Age and Sex

Age Categories	Male	Female	Total
Under 20	0	0	0
20-24	0	8	8
25-29	0	0	0
30-34	0	0	0
35-39	0	1	1
40-44	0	1	1
45 and over	0	0	0
Totals	0	10	10

The mean annual increase in budgeted numbers of MLT's over the past five years was 7.7 percent, and the year-by-year increase was 0.0 percent for 1973, 3.4 percent for 1974, 19.5 percent for 1975, and 7.8 percent for 1976 (or from 1976 to 1977). The employers reported that an increase of 10.5 percent over the present budgeted number of MLT's would be required to provide optimum health services. Over the next two, five, and ten years, the employers estimated required budgeted numbers of MLT's equal to increases of 12.8 percent, 38.4 percent, and 52.3 percent respectively over the present budgeted number. However, only two of 16 employers who responded to the question indicated present vacancies, and for only three positions.

Too few of the MLT employers indicated an estimated rate of change in the employment opportunities to provide a basis for collective judgment, but their informal comments indicated that there would be little growth. Several employers mentioned an increase in the use of more advanced technology, and that present MLT's would therefore be able to meet any increase demand for health services. Some even suggested a decrease in the required number of MLT's due to improved technology. One person stated "It all depends upon the changes HEW makes in their regulations. The demand in the future will be for those who are college trained."

At the national level, Health Resources Administration projected medical technologists and certified laboratory assistants, but not medical laboratory technicians. The Bureau of Labor Statistics indicated that "medical laboratory workers" would increase by a low 1.9 percent per year, but didn't define "worker" in their summary report (78: 48).

A national annual survey of laboratory training programs regarding supply and demand of medical laboratory personnel was conducted by the National Accrediting Agency for Clinical Laboratory Sciences, beginning in 1971. Their

conclusion in the 1974 survey was that "there continues to be an oversupply of applicants (for training) nationwide with few exceptions. The shortage of job openings at graduation appears to be more local than national, and there are fewer programs reporting difficulty this year than last (20 percent vs 30 percent). The relative large number of 'no response' leaves these findings somewhat to question" (45: 6).

Part of the survey results was an opinion poll summarized by each state. The opinions reported for West Virginia were that the demand is decreasing but that the supply is equal to the demand (45: 10). The 1975 survey did not report results by states but nationally. Seventy-four percent of programs responding said that the supply of medical technicians was equal to or greater than the demand (46: 6).

The Center for Disease Control is presently involved in updating the information collected from 12,296 clinical and public health laboratories during 1971-72 through a contract with the American Society for Medical Technology. The data have been collected but the computer printouts are not yet available.

As a result of the above considerations, a basic growth factor of 5.0 percent was selected, and maximum and minimum projected annual increases were 8.0 percent and 1.0 percent, respectively. The 1.0 percent would approximate what the employers are saying, and the 8.0 percent is based more on past growth rates.

The replacement rate indicated by employers was quite low, with four reporting no turnover at all. The rate of 5.0 percent was selected as the proportion of supply which would have to be replaced by newly trained MLT's. The following projection is therefore based on the assumptions that (1) maximum, basic, and minimum increases in demand will be 8.0 percent, 5.0 percent, and 1.0 percent, respectively; (2) 5.0 percent of the supply in any year will be

replaced by newly trained MLT's; and (3) there will continue to be nine MLT's trained and employed in the seven-county area each year.

Training Needs

The projections shown in Table MLT-2 indicate that the number of medical laboratory technicians will increase from the present 41 to either 89, 67, or 45, depending on the maximum, basic, or minimum projections. According to the basic projection, between four and six newly trained MLT's will be needed each year for the next ten.

If MLT's continue to be trained at a rate of nine per year, between five and three will have to obtain employment outside the seven-county area, according to the basic projection. The projections indicate that the training pace is more than keeping up with the employment needs. As noted earlier, there was a great deal of confusion concerning the classification of the various laboratory personnel. This should be kept in mind in the interpretation of the above projections.

Table MLT-2

Projected Number of Medical Laboratory Technicians Required
to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	41	41	41				9			
1978	44	43	41	[illegible]	4	2	9	-4	-5	-7
1979	48	45	42	6	4	3	9	-3	-5	-6
1980	52	47	42	6	4	2	9	-3	-5	-7
1981	56	50	43	7	5	3	9	-2	-4	-6
1982	60	52	43	7	5	2	9	-2	-4	-7
1983	65	55	44	8	6	3	9	-1	-3	-6
1984	70	58	44	8	6	2	9	-1	-3	-7
1985	76	61	44	10	6	2	9	1	-3	-7
1986	82	64	45	10	6	3	9	1	-3	-6
1987	89	67	45	11	6	2	9	2	-3	-7

*Supply: Total number of persons required in work force each year, based on an 8.0% (maximum), a 5.0% (basic), and a 1.0% (minimum) increase in demand plus a 5% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

MEDICAL RECORD TECHNICIAN

Occupational Description

The medical record technician is an important member of the health team in the medical record department of a hospital, nursing home, clinic, or other health care institution. His duties vary with the size of the establishment in which he works. In a small hospital he may perform all types of duties in the department, and may also help out in the business or admitting offices. In larger hospitals and health centers, he may concentrate on a specific phase of endeavor and become a specialist in one or two areas.

The medical record technician serves as a technical assistant to the registered record administrator, carrying out the many technical activities within a medical record department. The medical record technician's duties chiefly include: (1) reviewing medical records for completeness and accuracy, and coding diseases and operations; (2) filing medical records, supervising file clerks, and preparing records for microfilming; (3) typing medical reports of operations, x-ray and laboratory examinations, and special treatments given to patients; (4) compiling various statistics, including the hospital's daily census and information on reportable diseases for public health authorities and others; (5) assisting the medical staff by preparing special studies and tabulating data from records for research; (6) functioning within the day-to-day operation of a medical record department, taking records to court, and maintaining the flow of health information to all departments of the hospital.

Prerequisites for admission to an AMA-accredited program for medical record technicians require graduation from high school or certification of equivalent training. Courses include medical terminology, anatomy and physiology, and medical record science.

As soon as the medical record technician has completed his course of study in an accredited program, he is eligible to take the two part examination given by the American Medical Record Association. If he passes this exam, the technician earns the title of Accredited Record Technician, and is able to use the initials ART after his name. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 311-312].)

Sources of Data

The local source of data for medical record technicians was 11 employing agencies and one associate degree program.

The training program is at West Virginia Institute of Technology, and upon completion of the program, students are allowed to take the national exam for accreditation prepared by the American Medical Association. The West Virginia Tech program was reorganized in 1975, at which time 15 students were enrolled. Ten of those will graduate in 1977.

The questions asked representatives of the employing agencies are given by the interview schedule included in Appendix B.

Supply Characteristics

The 11 employers reported one male and thirty-one female medical record technicians, for a current supply of 32.

The training program at West Virginia Tech will graduate 12 MRT's in 1977. All are female, 11 are from 20-24 years of age, and one is between 35-39 years old. Historically, 50.0 percent of the graduates have remained and become employed in the seven-county area.

Demand Characteristics

Several factors could influence changes in demand for medical record technicians. Some are local and some national in scope.

Locally, the mean annual increase in budgeted MRT positions over the past five years is 6.7 percent, based on increases of 8.3 percent in 1973, no change in 1974, 11.5 percent in 1975, and 6.9 percent in 1976. However, only two agencies reported vacancies, and for three positions. The employers estimate

a number of budgeted MRT's equal to a two-year increase of 29.0 percent, a five-year increase of 41.5 percent, and a ten-year increase of 51.6 percent.

When asked to estimate the percent change in two, five, and ten years, the median estimate was 6.5 percent, 10.0 percent, and 10.0 percent respectively. According to the employers, the number of MRT's required to provide optimum health services is 45, or an increase of 45.1 percent over the present budget level.

At the national level, the Bureau of Labor Statistics projects an increase in "medical record librarians" of 152.0 percent between 1972 and 1985, or 7.4 percent per year (78: 48). The Health Service Agency projects a 29.0 percent increase in the number of medical record technicians between 1970 and 1980, and a 39.0 percent increase between 1980 and 1990. The ratio of MRT's to total population at the national level indicates that the seven-county area should have only eight "formally trained medical record technicians" (64: 182), which is only one-fourth the number presently employed in the area. Apparently, MRT's are not as widely used in other sections of the country as in the seven-county area, or those reported in the seven-county survey are not "formally trained."

Also at the national level, the effect of certain programs such as Medicare or Medicaid on the demand for MRT's is not presently known. Federal programs may require the use of an accredited MRT, and another source of increased demand may be employment by insurance companies. One factor which may decrease the demand is a tendency for health service agencies to use MRT's on a consultant basis, thereby decreasing the number of individuals required to serve an area.

The projected increase due to demand is 14.0 percent, 6.7 percent, and 3.0 percent for the maximum, basic, and minimum projections. The maximum is about what the employers expect according to their budget estimates,

the basic is the average historical increase in budgeted MRT's, and the minimum rate is about half the historical increase rate.

A very low turnover rate for MRT's was described by the local employers. At the national level, the number of graduates is projected to make up about 9.7 percent of the supply for a given year (54: 182). The projected replacement rate or percent of present supply which must be replaced by newly-trained MRT's, is 9.7 percent, the same as that projected by the Health Resources Administration.

The MRT projection is therefore based on an effective replacement rate of 9.7 percent; a maximum, basic, and minimum demand increase of 14.0 percent, 6.7 percent, and 3.0 percent, and an addition to supply of six locally-trained graduates each year. The latter figure is one-half of those trained at West Virginia Tech this year.

Training Needs

The projections shown in Table MRT-1 indicate that the training needs for medical record technicians are now being met. The basic projection has the number increasing from the current 32 to 61 in 1987, and indicates that an additional four newly-trained MRT's will be needed at that time. The projection assumes that six MRT's will continue to be trained annually for the next ten years, and the last three columns indicate the number required in addition to those graduates.

Table MRT-1

Projected Number of Medical Record Technicians Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	32	32	32				6			
1978	36	34	33	7	5	4	6	1	-1	-2
1979	42	36	34	9	5	4	6	3	-1	-2
1980	47	39	35	9	6	4	6	3	0	-2
1981	54	41	36	12	6	4	6	6	0	-2
1982	62	44	37	13	7	4	6	7	1	-2
1983	70	47	38	14	7	5	6	8	1	-1
1984	80	50	39	17	8	5	6	11	2	-1
1985	91	54	41	19	9	6	6	13	3	0
1986	104	57	42	22	8	5	6	16	2	-1
1987	119	61	43	25	10	5	6	19	4	-1

*Supply: Total number of persons required in work force each year, based on a 14% (maximum), 6.7% (basic), and 3% (minimum) increase in demand plus a 9.7% turnover or replacement rate.

**Need: Number of locally-trained persons required to replenish supply, based on demand and replacement assumptions.

DENTAL HYGIENIST

Occupational Description

Dental hygienists are oral health clinicians and educators who aid the public in developing and maintaining good oral health. As members of the dental health team, dental hygienists may perform preventive and therapeutic services under the supervision of the dentist. Specific responsibilities of the hygienist vary, depending on the law of the State where the hygienist is employed, but may include: removing deposits and stains from patients' teeth; providing instructions for patient self-care, and dietetic and nutritional counseling; and the application of medicine for the prevention of tooth decay. They take medical and dental histories, expose and develop dental X-ray films, make model impressions for study, and prepare other diagnostic aids for use by the dentist. Pain control and restorative procedures also are handled often by dental hygienists.

Dental hygienists who work in school systems examine children's teeth, assist dentists in determining the dental treatment needed, and report their findings to parents. They also clean teeth and give instruction on correct mouth care. Some help to develop classroom or assembly programs on oral health. Dental hygienists employed by health agencies work in dental clinics. A few assist in research projects. Those having advanced training may teach in schools of dental hygiene.

Dental hygienists must be licensed. To get a license, a candidate must be a graduate of an accredited dental hygiene school, except in Alabama, and pass both a written and clinical examination. In 1974, candidates in 49 States and the District of Columbia could complete part of the State licensing requirements by passing a written examination given by the National Board of Dental Examiners.

In 1975, 163 schools of dental hygiene in the United States were accredited by the American Dental Association. Most programs grant a certificate or an associate degree; others lead to a bachelor's degree. Some institutions offer both types of programs. Twelve schools offer master's degree programs.

Completion of an associate degree program is sufficient for dental hygienists who want to practice in a private dental office. In order to do research, teach, and work in public or school health programs, a baccalaureate degree usually is required. (Excerpted from U. S. Department of Labor, Occupational Outlook Handbook, 1976-77 Edition [76: 439].)

Sources of Data

Data concerning the present number of dental hygienists now employed in the seven-county area were obtained from the dentists practicing in the area. A questionnaire printed on a return-addressed card was mailed to the dentists' offices as listed in the telephone directories of the seven counties, and a follow-up card yielded 75 responses, or 63.6 percent of the total number of 118 dentists. Someone in the 43 offices remaining were contacted by telephone in order to obtain as much information as possible, and questionnaire responses were compared with telephone interview answers. The questionnaire card and introductory letter is included in Appendix B. In addition, an informal survey of the public schools in the area indicated that seven dental hygienists were employed by the County Boards of Education.

Data concerning training programs for dental hygienists were obtained by interview from the staff at West Virginia Institute of Technology, which offers the only training program in the seven-county area.

The data are judged to be of good quality, since there was no confusion over who was or wasn't a dental hygienist, and the dentists appeared to take the responses seriously. There was good consensus concerning the degree of demand increase, and most responses were complete. It should be noted that attempts to get complete, up-to-date information from the West Virginia Board of Dental Examiners was unsuccessful. While the American Association of Dental Examiners was authorized by the Executive Secretary of the West Virginia Board of Dental Examiners to release a copy of the West Virginia Dental Manpower Register in April, the information was not received as of June 15, 1977.

Supply Characteristics

According to the returns from 125 respondents, there are 75 dental hygienists employed in the seven-county area. All those who work in private practice are female, and all but eight of them work in single office settings. Two offices employ three each, one employs two hygienists, and 62 offices do not employ a dental hygienist. Four dental hygienists work for the State Department of Health. The median age of the dental hygienists is 26.4 years, and none is over 50 or under 20 years of age. The distribution by age of those currently employed is shown in Table DH-1.

The dental hygienist training program at the West Virginia Institute of Technology in Montgomery, West Virginia, is a two-year associate degree program.

There were 17 graduates from the program this year, and 19 graduated in 1976. All of this year's graduates are female, and all are between 20 and 24 years of age. Based on last year's statistics, 57.9 percent of this year's graduates, or ten persons, will become employed in the seven-county area.

Demand Characteristics

The demand for dental hygienists is expected to increase some over the next few years. Special factors which could influence demand for this group are unexpected breakthroughs in technology, changes in dental insurance practices, and changes in the amount of responsibilities dentists are willing to relinquish. For example, lacking any tangible evidence, the number of dental hygienists was assumed to vary directly with the number of practicing dentists when the questionnaire was designed. However, a recent article indicates that, nationally over the next eight years, the number of dental hygienists will increase by more than a ratio of 2.5 (from 23,000 to 58,000),

Table DH-1

Age Distribution of Those Employed as Dental Hygienists in Seven-County Area

Age Categories	Male	Female	Total
Under 20	-	-	-
20-24	-	19	19
25-29	-	14	14
30-34	-	10	10
35-39	-	2	2
40-44	-	7	7
45-49	-	2	2
50-54	-	2	2
Data not available	-	19	19
Totals	-	75	75

while the number of dentists will increase only 38 percent over the present number (from 100,000 to 138,000) (80: 82-83).

The dentists were asked to estimate the increase or decrease in demand over the next two, five, and ten years as indicated by the questionnaire card included in Appendix B. The research team believes that the dentists who responded are in the best position to project demand, and data from them are used as a basis for the following projection. Since the number of dental hygienists is dependent on the number of dentists, the dentists were asked to estimate changes in their own number. More than half of them gave some indication, but a few indicated that they were unable to estimate. For example, one dentist said "I have no idea, but it has really been increasing over the past 25 years." All who gave estimates indicated that they expected increases.

The dentists indicated that 26 persons would be required for replacement and that another 30 would be required for increased services within two years, or that 28 dental hygienists are required each year to meet needs. As indicated by Table DH-2, this estimate was considered high since an increase of 40 percent each year over the preceding year would produce four times the present number of hygienists within five years.

The Bureau of Labor Statistics projected an increase in the number of dental hygienists of 191.0 percent between 1972 and 1985, an increase of almost twice the number practicing in 1972. The projected annual increase was a high 8.6 percent per year, while the dentists were projected to increase by only 2.2 percent per year (78: 48).

The Health Resources Administration projected an increase of 126.5 percent in the number of dental hygienists between 1970 and 1980, and of 68.7 percent between 1980 and 1990 (54: 143). The ratio of dental hygienists to population in the country indicates that 42 dental hygienists should be employed in the

seven-county area, so Charleston is apparently ahead of the national trend (64: 178). The HRA projected ratio of active dental hygienists to current supply yield a number equal to from 17.1 percent in 1977 to 11.7 percent in 1987.

The replacement rate of 14.0 percent per year was used over all ten years of the projection, and the supply for each year was increased by 4.3, 8.6, and 10 percent over the base year of 1977 for each of the subsequent ten years. By this procedure, the minimum number of employed dental hygienists in 1987 would be 114, the basic projected number would be 171, and the maximum projected number would be 195 (Table DH-2).

Training Need

Since West Virginia Tech is now training approximately 20 dental hygienists each year, and half of them remain in the seven-county area, the number of required replacements can be decreased by ten each year, assuming that they continue at the present rate. The basic projection, therefore, indicates that an additional seven to twenty-five newly-trained persons need to enter the supply each year, from 1978 through 1987.

One special word of caution is that the effective turnover rate, 14.0 percent, could be low. The dental hygienists tend to be relatively young women (Table DH-1), and changing economic and social conditions could increase the rate thereby increasing the demand.

Table DH-2

Projected Number of Dental Hygienists Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need			No. Graduates Retained in Region	Additional Training Need		
	Max	Bas	Min	Max	Bas	Min		Max	Bas	Min
1977	75	75	75				10			
1978	83	81	78	19	17	14	10	9	7	4
1979	91	88	82	20	18	15	10	10	8	5
1980	100	96	85	22	20	14	10	12	10	4
1981	110	104	89	24	21	16	10	14	11	6
1982	121	113	93	26	24	16	10	16	14	6
1983	133	123	97	30	26	17	10	20	16	7
1984	146	134	101	32	28	18	10	22	18	8
1985	161	145	105	35	30	18	10	25	20	8
1986	177	158	110	39	33	20	10	29	23	10
1987	195	171	114	43	35	19	10	33	25	9

*Supply: Total number of persons required in work force each year, based on a 10.0% (maximum), an 8.6% (basic), and a 4.3% (minimum) increase in demand plus a 14.0% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

PART B

Occupations With No Training Programs in the Seven-County Area

PHYSICAL THERAPIST

Occupational Description

Physical therapy is concerned with the restoration of function and the prevention of disability following disease, injury, or loss of a bodily part. The goal is to improve circulation, strengthen muscles, encourage the return of motion and generally, to train or retrain the patient to perform the activities associated with daily living. The therapeutic properties of exercise, heat, cold, electricity, ultraviolet, and massage are used to achieve this goal.

In addition, emphasis is placed on preparing patients psychologically for treatment. Since the seriously disabled are often emotionally distraught and burdened by feelings of hopelessness, ways must be found to eliminate these barriers and gain the confidence of patients before effective long-range treatment can commence.

The prerequisite for admission to AMA/APTA approved programs for physical therapists requires graduation from a high school accredited by the appropriate regional association of colleges and secondary schools, or certification of equivalent knowledge. The preparation of a physical therapist requires at least four academic years of college or university work, leading to a baccalaureate degree. Those persons already having a baccalaureate degree in some field other than physical therapy may enroll in a post-baccalaureate program leading to a certificate of proficiency, or to a master's degree in physical therapy.

All educational programs emphasize biological and physical sciences basic to understanding the functioning of the human body, as well as social sciences basic to understanding how to interrelate with patients and members of other health professions. Clinical education is planned to supplement didactic instruction.

Those persons completing an AMA/APTA approved educational program and required clinical experience may apply for licensure and/or registration in the state in which they wish to practice. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 363].)

Sources of Data

A considerable amount of information was available, especially concerning the present supply of physical therapists. Much of it is included in tabular form, and particularly that which pertains to training needs.

Sources of data included the West Virginia Board of Examiners, the State Department of Health, and the ten health service agencies in the seven-county area which employ PT's. State Department of Health personnel processed licensure data provided through the Board of Examiners, and the employer representatives participated in an interview. The interview schedule is included in Appendix B.

As with some other occupations, a serious projection hazard is introduced by the small number of PT's in the area. A few PT's in 1977 can influence the 1987 projection beyond recognition.

Supply Characteristics

An analysis of the licensure data indicated that there are 27 full-time and four part-time physical therapists now working in the seven-county area.

The PT's spread across all age groups fairly evenly. As shown by Table PT-1, only 9.7 percent are in the 20-24 age group, and 61.3 percent of them are from 25 to 39 years of age. The age distribution is one usually associated with low turnover rates. About two-thirds of the PT's are female (Table PT-2), about all of them are Caucasian (Table PT-3), and about two-thirds are married (Table PT-4). About one-third of the PT's are licensed in other states, which may indicate a tendency for some to seek positions outside the seven-county area (Table PT-5).

Four of the "full-time" physical therapists worked less than 46 weeks in 1976 (Table PT-6). They may have been recent trainees, and the two "part-time" PT's who worked from 46 to 49 weeks may have worked part-time each week.

Table PT-1

Physical Therapists Employed in
Seven-County Area by Age

Age Category	Full-Time	Part-Time	Total	Percent
Under 20	0	0	0	
20-24	3	0	3	9.7
25-29	9	0	9	29.0
30-34	1	1	2	6.5
35-39	6	2	8	25.8
40-44	2	0	2	6.5
45-49	2	1	3	9.7
50-54	2	0	2	6.5
55-59	1	0	1	3.2
Over 60	1	0	1	3.2
Totals	27	4	31	100.0

Table PT-2

Physical Therapists Employed in
Seven-County Area by Sex

	Full-Time		Part-Time		Total	
	No.	%	No.	%	No.	%
Male	9	29.0	0		9	29.0
Female	18	58.1	4	12.9	22	71.0
Totals	27	87.1	4	12.9	31	100.0

Table PT-3

Physical Therapists Employed in
Seven-County Area by Race

	Full-Time	Part-Time	Total
Caucasian	26	4	30
Black	0	0	0
American Indian	0	0	0
Oriental or Asian	0	0	0
No Response	1	0	1
Totals	27	4	31

Table PT-4

Marital Status of Physical Therapists
Employed in Seven-County Area

	Full-Time		Part-Time		Total	
	No.	%	No.	%	No.	%
Never Married	9	29.0	0		9	29.0
Married	16	51.6	4	12.9	20	64.5
Separated	0		0		0	
Divorced	0		0		0	
Widowed	1	3.2	0		1	3.2
Missing Data	1	3.2	0		1	3.2
Totals	27	87.0	4	12.9	31	100.0

Table PT-5

Number of Physical Therapists in Seven-County Area Licensed in Other States

	Full-Time		Part-Time		Total	
	Yes	No	Yes	No	Yes	No
Licensed in other states	8	19	2	2	10	21
Percent	29.6	70.4	50.0	50.0	32.3	67.7

Table PT-6

Weeks Worked in Past 12 Months by Physical Therapists

	Full-Time	Part-Time	Total
Less than 46	4	2	6
46-49	5	2	7
50-52	18	0	18
Totals	27	4	31

As indicated by Table PT-7, almost two-thirds of the PT's are employed in hospitals, and another one-fifth work for schools or treatment centers for the handicapped. Half of the PT's reported their primary activity to be orthopedics (Table PT-8), and half indicated that they had the title of staff physical therapist (Table PT-9). As for primary form of employment, two-thirds reported "other non-governmental employer," which includes hospitals (Table PT-10).

According to Table PT-11, 41.9 percent have been active five years or less since first licensed. When compared with Table PT-1, the conclusion is that, in contrast to some of the other nursing and allied health occupations, several of the PT's were at least in their 30's before they became licensed. More than half of the PT's have a bachelor's degree (Table PT-12), and about one-third received their highest degree in 1943-61, and another third between 1972 and 1976 (Table PT-13).

As a matter of interest, there are 141 full-time and part-time licensed PT's in West Virginia. The seven-county area has 30.0 percent of the PTs' working in the state, and 21.4 percent of the state's total population.

The ten local employers reported a total of 27 PT's working as of May, 1977. The number of part-time plus full-time PT's reported through licensure was 31, and this number was used as the projection base since the AEL survey may have missed a few.

Demand Characteristics

Primary sources of demand-related information was the employers and certain federal agencies.

The employers were asked the budgeted number of PT's over the past five years, and the mean change was an increase of 8.0 percent. The changes in employment by years were increases of 15.4 percent in 1973, 20.0 percent in

Table PT-7

Principal Setting of Physical Therapist Activity in Seven-County Area

	No. Full-Time	No. Part-Time	Total No.	Total %
General Hospital	16	3	19	61.3
Medical Center Teaching Hospital	1	0	1	3.2
Group Health Care Facility	0	0	0	
Nursing Home	0	1	1	3.2
Freestanding Community Clinic	1	0	1	3.2
Athletic Treatment Facility	0	0	0	
Private Physical Therapy Practitioner's Office	1	0	1	3.2
Health Facility on Military Installation, etc.	0	0	0	
Patient's Home	1	0	1	3.2
Medical Research Institution	0	0	0	
Professional or Allied Health Association	0	0	0	
School or College of Physical Therapy	0	0	0	
Other School or College	0	0	0	
School or Treatment Center for Handicapped	7	0	7	22.6
Elementary or High School	0	0	0	
Totals	27	4	31	100.0

Table PT-8

Primary Activity Area of Physical Therapists
in Seven-County Area

	No. Full-Time	No. Part-Time	Total No.	Total %
Administration	0	0	0	
Community Health	2	0	2	6.4
Education (Teaching)	0	0	0	
Sports Medicine	0	0	0	
Research	0	0	0	
Other, Specified	5	0	5	16.1
Other, None Specified	3	0	3	9.7
Consultation	0	0	0	
Neurology-Neurosurgery	1	0	1	3.2
Orthopedics	13	3	16	51.6
Pediatrics	3	0	3	9.7
Nursing Data	0	1	1	3.2
Totals	27	4	31	100.0

Table PT-9

Title of Position for Respiratory Therapists

	Full-Time	Part-Time	Total No.	Total %
Department Head or Administrator	5	0	5	16.1
Chief Physical Therapist	7	0	7	22.6
Assistant Chief Physical Therapist	2	0	2	6.4
Supervisor	0	0	0	
Staff Physical Therapist	13	3	16	51.6
Instructor--Physical Therapy Curriculum	0	0	0	
Instructor--Other Field	0	0	0	
Athletic Trainer	0	0	0	
Missing Data	0	1	1	3.2
Totals	27	4	31	100.0

Table PT-10

Primary Form of Employment for
Physical Therapists

	No. Full-Time	No. Part-Time	Total No.	Total %
Solo Practice or Single Owner Business	1	1	2	6.4
Partnership or Group-Owned Practice	0	0	0	
Individual Practitioner	0	0	0	
Partnership/Group of Practitioners	0	0	0	
Group Health Plan Facility	1	0	1	3.2
Other Nongovernmental Employer	18	3	21	67.7
Local	0	0	0	
County Government	1	0	1	3.2
State Government	6	0	6	19.4
Federal	0	0	0	
Unpaid Worker	0	0	0	
Totals	27	4	31	100.0

Table PT-11

Years Active Since First Licensed
for Physical Therapists

	Full-Time		Part-Time		Total	
	No.	%	No.	%	No.	%
0-5	13	41.9	0		13	41.9
6-10	3	9.7	3	9.7	6	19.4
11-15	8	25.8	1	3.2	9	29.0
16 +	3	9.7	0		3	9.7
Totals	27	87.1	4	12.9	31	100.0

Table PT-12

Education Level of Physical Therapists

	No. Full-Time	No. Part-Time	Total	
			No.	%
Certificate	11	3	14	45.2
BA/BS	16	1	17	54.8
MA/MS	0	0	0	
Totals	27	4	31	100.0

Table PT-13

Year Highest Degree Was Received

	No. Full-Time	No. Part-Time	Total No.	Total %
1943-61	9	2	11	35.5
196.	2	1	3	9.7
1967-71	6	1	7	22.6
1972-76	10	0	10	32.2
Totals	27	4	31	100.0

Table PT-14

Number of Physical Therapists Licensed in West Virginia and Practicing on 1-1-77

	No. Full-Time	No. Part-Time	Total No.	Total %
Seven-County Area	27	4	31	100.0
West Virginia	98	17	115	81.6
Out of State	24	2	26	18.4
Total Licensed in State	122	19	141	100.0

1974, no change in 1975, and a decrease of 3.4 percent in number of PT's employed in 1976. This represents one of the most serious declines in employment rates of any of the occupations. When asked what number would be required to optimally provide services to clients, the ten employers responded with one additional PT, or 3.6 percent greater than the percent budgeted. Only one of the employers reported a vacancy, and for one PT.

The employers were asked to estimate the number budgeted in two, five, and ten years. They responded with numbers equal to no change in two years, and increases of 7.1 percent in five years and 21.4 percent in ten years. When asked to indicate the expected percent increase, the median rate was 10.0 percent for two, five, and ten years.

At the national level, the Bureau of Labor Statistics projects a 76.3 percent increase in the number of PT's between 1972 and 1985, or a medium-range average increase of 4.5 percent per year (78: 48). The Health Resources Administration also projects a medium-range increase of 99.4 percent in numbers of employed PT's between 1970 and 1980, and of 58.8 percent between 1980 and 1990. The national PT to population ratios indicate that the seven-county area should be served by about 30 PT's, or approximately the same number now available.

The demand rate selected for the basic projection was a fairly low 5.0 percent, since most indicators appeared to point toward less increase in demand. The maximum rate was 8.0 percent, the historical increase according to the employers' budgets. The minimum rate was 2.5 percent, one-half the basic projection.

The employers reported practically no turnover in PT's. Nationally, the projected additions of graduates to active supply ranged from 11.6 percent in 1977 to 8.1 percent in 1987. The mean, or 9.8 percent was selected as the number of newly trained PT's required in the seven-county area each year.

Training Requirements

According to the basic projection shown in Table PT-15, the supply of physical therapists will increase from 31 in 1977 to 50 in 1987, a change of 61.3 percent over ten years. Between five and seven newly-trained physical therapists will be required each year from 1978 through 1987.

Table PT-15

Projected Number of Physical Therapists Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need		
	Max	Bas	Min	Max	Bas	Min
1977	31	31	31			
1978	33	33	32	5	5	4
1979	36	34	33	6	4	4
1980	39	36	33	7	5	3
1981	42	38	34	7	6	4
1982	46	40	35	8	6	4
1983	49	42	36	8	6	4
1984	53	44	37	9	6	5
1985	57	46	38	9	6	5
1986	62	48	39	11	7	5
1987	67	50	40	11	7	5

*Supply: Total number of persons required in work force each year based on an 8.0% (maximum), a 5.0% (basic), and a 2.5% (minimum) increase in demand plus a 9.8% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

RESPIRATORY THERAPIST

Occupational Description

Respiratory (formerly inhalation) therapy personnel perform procedures essential in maintaining life of seriously ill patients with respiratory problems and they assist in the treatment of heart and lung ailments, such as cardiac failure, asthma, emphysema, cerebral thrombosis, hemorrhage and shock. Under medical supervision, the respiratory therapy technician administers various types of gas, aerosol, and intermittent-positive-pressure breathing treatments; assists with long-term continuous artificial ventilation; cleans, sterilizes and maintains respiratory therapy equipment; and maintains records of patient's therapy. The respiratory therapist is usually engaged in similar tasks, but the preparation of the therapist leads to more extensive knowledge of anatomy, physiology, pharmacology and clinical medicine--designed to enable the therapist to exercise more judgment and accept greater responsibility in performing therapeutic procedures based on observations of patients.

Graduation from an accredited high school or certification of equivalent education is required for admission to an AMA-accredited program for preparation as a respiratory therapist. These programs are a minimum of two years in length and lead to an associate degree (or, in some instances to a baccalaureate degree). In addition to more extensive courses in biological physical, and medical sciences, the program of study includes social sciences basic to understanding how to interrelate with patients--such as psychology, communication skills and medical ethics.

Graduates for two-year programs may apply to sit for the written and practical examinations for the therapist level administered by the National Board for Respiratory Therapy. Individuals meeting their requirements are recognized as registered respiratory therapists. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 465, 467].)

Sources of Data

The only local source of data for the respiratory therapists was the seven health service agencies which employ them. They responded to the interview schedule included in Appendix B. The employing agency reporting the greatest number of RT's was Thomas Memorial Hospital.

A special caution pertaining to all occupations with small numbers of employees is that projection can be very hazardous, since ratios can fluctuate widely just by chance hirings and administrative decisions. The addition of another 13 RT's would add another 100.0 percent or double the current supply.

Supply Characteristics

The employing agencies reported a total of 13 respiratory therapists employed in the seven-county area. Four are male, seven are female, and the sex of two RT's was not reported.

Demand Characteristics

Two types of demand data were available for RT's; that from the employing agencies and projections prepared by two federal agencies.

The number of RT positions budgeted from 1973 was seven, and the number grew to 13 in 1977. The mean increase per year was 18.6 percent, and the increases for each included year were 0.0 percent in 1973, 57.1 percent in 1974, 9.0 percent in 1976, and 8.3 percent in 1977.

When asked to estimate the number to be budgeted in two, five, and ten years, the employers responded with increased numbers equal to 30.8 percent, 76.9 percent, and 107.7 percent, respectively. This is one of the greatest estimated increases for any of the 16 occupations examined by the AEL research

team. In order to optimumly provide health services for their clients, the employers estimated a number 30.8 percent greater than the currently budgeted number. However, they reported no vacancies at the present time.

The median estimated increase in employment opportunity was 6.0 percent, 8.0 percent, and 8.0 percent for two, five, and ten years. In general, the statistical picture is of a recently emerging occupation which may continue to offer increased employment opportunities throughout the next ten years.

The two federal agencies which project RT employment trends are the Bureau of Labor Statistics and the Health Resources Administration. The BLS report has the number of RT's increasing by 77.0 percent between 1972 and 1985, or at an annual rate of 4.5 percent, or slightly less than licensed practical nurses (78: 48).

The HRA report has the number of RT's increasing by 173.0 percent between 1970 and 1980, and by 79.0 percent between 1980 and 1990 (64: 143). Interestingly, the HRA's 173.0 percent projected increase is more than double the BLS projected increase for 12 years.

The national RT to total population ratio indicates that about 16 RT's should be available to the seven-county population in order to meet national service norms. This would be an increase of 23.0 percent over current supply.

The rate selected for maximum increased demand was 18.6 percent, the historical budgeted increase, for the first five years and one-half the rate for the second five years, since the occupation will probably be saturated by that time. The basic projection is based on a 14.5 percent rate for the first five years and a subsequent 7.5 percent rate. The 14.5 percent rate is approximately the employer's estimated budgeted increase in RT's. The minimum projection is based on a constant 4.5 percent increase, the rate projected by BLS.

The turnover reported by local employers was practically nil, but over the next ten years, almost all vacancies will apparently have to be filled by newly-trained RT's. The RT's ratio of entering graduates to current supply is one of the highest of any occupation. Nationally, the number of entering graduates is projected at 15.1 percent of the number in current supply for 1977, and the rate decreases to 9.6 percent by 1987 (64: 181).

The figure selected for replacement which must be provided from new trainees was 14.0 percent for the first five years and 10.0 percent for the second five-year span.

Replacement Needs

The basic projection indicated that 17 respiratory therapists will be needed in 1979, 26 in 1982, and 37 in 1987 (Table RT-1). The ten-year increase over current supply is 24, or an increase of 284.6 percent, according to the basic projection.

The basic projection also indicated that between four and six RT's would need to be trained each year for the next ten, or that these newly-trained persons will have to be sought from outside the seven-county area.

Table RT-1

Projected Number of Respiratory Therapists Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need		
	Max	Bas	Min	Max	Bas	Min
1977	13	13	13			
1978	15	15	14	4	4	3
1979	18	17	14	5	4	2
1980	22	20	15	7	5	3
1981	26	22	16	7	5	3
1982	31	26	16	9	7	2
1983	34	28	17	6	5	3
1984	37	30	18	6	5	3
1985	40	32	18	7	5	2
1986	44	34	19	8	5	3
1987	48	37	20	8	6	3

*Supply: Total number of persons required in work force each year, based on increases of 18.6% for five years and 9.3% for the next five years (maximum projection), of 14.5% for five years and 7.5% for five years (basic projection), and a constant 4.5% (minimum) increase in demand plus a turnover or replacement rate of 14.0% for the first five years and a 10.0% for the second five.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

NUCLEAR MEDICINE TECHNOLOGIST

Occupational Description

Nuclear medicine is the scientific and clinical discipline concerned with diagnostic, therapeutic (exclusive of sealed radiation sources) and investigative use of radionuclides.

The nuclear medicine technologist receives, positions, and attends to patients, and abstracts data from patient records; makes dose calculations for in vivo studies; and assists the physician in the operation of scanning devices using isotopes. He is greatly concerned with safety and has responsibility for disposal of radioactive waste, safe storage of radioactive material, and the inventory and control of radiopharmaceuticals.

To be suited for a career in nuclear medicine technology, one should have a basic understanding of the physical and biological sciences, as well as mathematics.

The Council on Medical Education of the American Medical Association collaborates with the following organizations in the review and approval of educational programs in nuclear medicine technology: American College of Radiology, American Society of Clinical Pathologists, American Society for Medical Technology, American Society of Radiologic Technologists, and Society of Nuclear Medicine. These collaborating organizations collectively sponsor a single review body known as the Joint Review Committee on Educational Programs in Nuclear Medicine Technology.

The Essentials of an Accredited Educational Program in Nuclear Medicine Technology provide standards for two levels of programs: two year associate degree level programs for the technician, and baccalaureate level programs for the technologist. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 324-326].)

Sources of Data

The only source of data for the nuclear medicine technologists was the four health service agencies in the seven-county area which employ NMT's. The two employers with the greatest number of NMT's were Charleston Area Medical Center and St. Francis Hospital.

As with respiratory therapists, the numbers are small and projections are therefore unusually hazardous. They are especially questionable since there are no national projections or occupation to population ratios available.

Supply Characteristics

There are currently 11 nuclear medicine technologists employed in the seven-county area. Two are male, four are female, and the sex of five was not provided. At the present time there are no training programs in West Virginia. However, West Virginia State College, in cooperation with Charleston Area Medical Center, is exploring the possibility of initiating such a program.

Demand Characteristics

The budgeted number of nuclear medicine technologists during the past five years was three in 1973 and 1974, eight in 1975, 13 in 1976, and 17 in 1977. The mean increase rate per year is 65.0 percent and the changes by year are a widely fluctuating 0.0 percent for 1973, 166.7 percent for 1974, 62.5 percent for 1975, and 30.8 percent for 1976.

A difference between the 1977 budgeted number, 17, and the currently employed number, 11, exists because one employing agency reported four NMT's employed, ten budgeted, and six vacancies for 1977.

When asked to estimate the numbers to be budgeted two, five and ten years from now, the employers responded with numbers equal to increases of 6.2

percent, 18.8 percent, and 25.0 percent. In order to optimally meet demands, a number of NMT's 81.8 percent greater than current supply would be required.

The median projected rate of growth for two, five, and ten years was 11.5 percent for the entire ten years.

Since the NMT's apparently represent a high demand occupation at the present time, a maximum rate of increase due to growth was established at 65.0 percent, the historical average budget increase, for two years, and then at an arbitrary 6.5 percent or one-tenth the initial rate, for the next eight years. The basic projection is 81.8 percent for the first year, and 11.5 percent, the employer estimate, for the remaining nine years. The minimum projection is based on a rate of 6.2 percent per year, the employers estimate according to the increase in budgeted numbers in two years.

For lack of a better figure, a 10.0 percent effective replacement rate was projected. That rate is near the average for the other occupations, and means that one in ten NMT's will be replaced each year by newly trained programs.

Supply Requirements

The supply requirements shown in Table NMT-1 demonstrate the relatively high uncertainty regarding employment possibilities for nuclear medicine technologists. The basic projections, which turned out to be slightly more than the maximum projections (!), indicates that 22 NMT's will be employed two years from now, 31 in five years, and 53 in ten years. Fourteen (10 + 4) will need to be trained in the next two years, 17 in the next three years, and 41 from 1983 through 1987 in order to meet requirements for newly-trained graduates.

Table NMT-1

Projected Number of Nuclear Medicine Technologists Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need		
	Max	Bas	Min	Max	Bas	Min
1977	11	11	11			
1978	18	20	12	8	10	2
1979	30	22	12	14	4	1
1980	32	25	13	5	5	2
1981	34	28	14	5	6	2
1982	36	31	15	5	6	2
1983	39	34	16	7	6	3
1984	41	38	17	6	7	3
1985	44	43	18	7	9	3
1986	47	48	19	7	9	3
1987	50	53	20	8	10	3

*Supply: Total number of persons required in work force each year, based on an increase of 65.0% for two years and 6.5% for eight years (maximum projection), an increase of 81.8% for one year and 11.5% for nine years (basic projection), and an increase of 6.2% (minimum projection) in demand plus a 10% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

MEDICAL TECHNOLOGIST

Occupational Description

The medical technologist performs many routine and specialized tests in the clinical laboratory for the purpose of developing data which may be utilized by a qualified physician for the determination of the presence and extent of disease, as well as implications pertaining to the cause of disease. The myriad of tests and procedures performed or supervised by the medical technologist in the clinical laboratory includes the major areas of hematology, serology and immunology, chemistry, blood banking, microbiology and parasitology, urinalysis, histology, and cytology.

To be suited for a career in medical technology, one must have an aptitude and interest in the physical and biological sciences. Since the work frequently deals with life and death matters, it requires precision, dependability, and a strong sense of responsbility.

The Council on Medical Education of the American Medical Association, the American Society of Clinical Pathologists, and the American Society for Medical Technology collaborate in determining minimal educational standards, termed Essentials, for programs for medical technologists. The Council on Medical Education grants formal accreditation to educational programs which meet or exceed the agreed upon standards.

Admission to an AMA-accredited program for education and training of technologists requires a minimum of 90 semester hours (135 quarter hours) of academic credit in a college or university approved by a recognized regional accrediting agency. This academic credit must include appropriate course work in biology, chemistry, and mathematics. The clinical training program is at least 12 months in duration. Emphasis is placed upon the basic principles commonly utilized in diagnostic laboratory tests, with technical instruction pertaining to procedures in hematology, serology, clinical chemistry, microbiology and other areas pertinent to the total function and scope of the medical technologist in the clinical laboratory.

Graduates of AMA-approved programs for medical technologists are eligible for the registry examination given by the Board of Registry of the American Society of Clinical Pathologists. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 235].)

Sources of Data

The local source of data is the 21 employers of medical technologists in the seven-county area. The employer of the greatest number is the Charleston Area Medical Center.

Supply Characteristics

According to the responding health agencies, 52 MT's are currently employed in the seven counties. The employers reported that 5.5 FTE were male, 29.5 FTE were female, and the sex of 17 employees was not indicated.

Demand Characteristics

Information concerning demand was obtained from the area employers, as well as from national projections.

The budgeted number of MT's over the past five years represented a mean increase of 23.5 percent, or by year, 4.5 percent in 1973, 62.2 percent in 1974, 18.4 percent in 1975, and 8.9 percent in 1976. The employers estimated a budgeted number equal to increases of 26.5 percent, 52.0 percent, and 76.5 percent in two, five, and ten years.

When asked about the number required to provide optimum services, a number equal to an increase of 9.0 percent over present budget level was estimated. Generally, the occupation appears to be one of fairly rapid growth, but also one in which the training needs have been approximately met to date. Another indication that a growing training demand has been met in the past comes from the report prepared by the National Accrediting Agency for Clinical Laboratory Sciences described previously in conjunction with the projection of medical laboratory technicians. The report indicates that the demand for

medical technologists is increasing in West Virginia, but that the supply is equal to the demand (45: 10). Also, only three of 19 responding agencies reported vacancies, and for five MT's.

Several of the employers informally indicated that they expected the level of employment to remain about the same, and one said "The number will remain about the same, but with automation, you'll be able to carry a larger case load. There will be jobs in the rural settings." Another indicated "The requirements are changing--small labs will decrease and the large ones will expand."

When asked to estimate the rate of increase in two, five, and ten years, 13 employers responded with a median increase in demand of 10 percent per year over the entire period.

At the national level, the Bureau of Labor Statistics did not list medical technologists as a projection category, but rather, listed all "medical laboratory workers" together with a very low projected 1.9 percent annual rate of increase through 1982 (78: 48).

The Health Resources Administration projected an increase of 79.2 percent in the number of MT's between 1970 and 1980, and of 53.3 percent between 1980 and 1990. The national MT to population ratio indicates that there should be 105 MT's presently employed in the seven-county area, or about two times the current supply.

From the above considerations, a maximum growth rate due to increased demand was established at 23.5 percent, the historical budgeted growth rate, for five years, and at 13.0 percent for the remaining five years. The basic projection was placed at 13.0 percent per year for the entire ten years, which is the approximate rate estimated by the employers. Since several employers indicated no increase, and one a decrease, the BLS annual rate of 1.9 percent was used as a very low minimum rate for comparison purposes.

The reported turnover rate reported by employers was low. At the national level, the additions to supply by graduates was projected at from 11.4 percent to 8.2 percent of supply, so an effective replacement rate was selected at 9.8 percent.

Supply Requirements

As shown in Table MT-1, the number of medical technologists should increase from 52 to 177 within 10 years, or to more than three times the current supply.

The need for newly-trained MT's should increase from 12 in 1978 to 37 in 1987, according to the basic projection.

Table MT-1

Projected Number of Medical Technologists Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need		
	Max	Bas	Min	Max	Bas	Min
1977	52	52	52			
1978	64	59	53	17	12	6
1979	79	66	54	21	13	6
1980	98	75	55	27	16	6
1981	121	85	56	33	18	7
1982	149	96	57	40	20	7
1983	169	108	58	35	22	7
1984	191	122	59	39	25	7
1985	216	138	60	44	28	7
1986	244	156	62	50	32	8
1987	275	177	63	55	37	7

*Supply: Total number of persons required in work force each year, based on an increase of 23.5% for five years and 13.0% for the next five years (maximum), a 13.0% (basic), and a 1.9% (minimum) increase in demand plus a 10% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

CERTIFIED LABORATORY ASSISTANT

Occupational Description

The certified laboratory assistant performs many routine procedures in the clinical laboratory under the direction of a qualified physician and medical technologist. These procedures may involve hematology, serology, blood banking, urinalysis, microbiology, clinical chemistry, and other areas.

To be suited for a medical laboratory career, one must have an aptitude and interest in the physical and biological sciences. Since the work frequently deals with life and death matters, it requires precision, dependability, and a strong sense of responsibility. Adeptness in using the hands is essential because the laboratory assistant works with small instruments and delicate equipment. Normal vision and ability to distinguish fine shades of color are valuable assets.

The Council on Medical Education of the American Medical Association, the American Society of Clinical Pathologists, and the American Society for Medical Technology collaborate in determining minimal educational standards, termed Essentials, for programs for certified laboratory assistants. The Council on Medical Education grants formal accreditation to educational programs which meet or exceed the agreed upon standards.

The prerequisite for admission to an AMA-accredited program for the education and training of certified laboratory assistants is graduation from an accredited high school or certification of equivalent training. An accredited program is a minimum of 12 months in length. The program includes areas of medical ethics and conduct, medical terminology, basic laboratory solutions and media, basic elements of quality control, manipulation of histologic and cytologic specimens, blood collecting techniques, as well as an introduction to basic heratology, serology, blood banking, urinalysis, and other pertinent techniques.

Graduates of accredited programs are eligible for the national certification examination given by the Board of Registry of the American Society of Clinical Pathologists. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 234].)

Sources of Data

Local data concerning certified laboratory assistants were obtained from 17 employing agencies in the seven-county area. The employer of the greatest number was the Charleston Area Medical Center.

National projections were also available from the Bureau of Labor Statistics and Health Resources Agency.

Supply Characteristics

The local health service agencies reported a current supply of 71 certified laboratory assistants. Three were male, 31 were female, and the sex of 37 CLA's was not reported.

Demand Characteristics

Generally, the demand for certified laboratory assistants seems to be somewhat less than for the majority of the 16 nursing and allied health occupations.

The mean increase in budgeted numbers of CLA's over the past five years is 17.3 percent per year, but the rate of increase is much less now than previously. The rate of increase by year is 53.3 percent for 1973, 8.3 percent for 1974, 3.1 percent for 1975, and 4.5 percent for 1976. Only two employers report vacancies, and for three positions. When asked to indicate the number of CLA's required to optimally meet demand, the employers gave a number which was only three persons, or 4.2 percent greater than the present number of employees.

When the employers were requested to estimate the number of CLA's required for the next two, five, and ten years, they replied with numbers equal

to increases of 15.7 percent, 20.0 percent, and 27.1 percent over the present budgeted number. The median estimated percent increase was 11.0 percent per year for the ten-year period.

Informal remarks from the employers were both positive and negative regarding possible increases in employment. One person said "There will be a gradual increase--mines are expanding, the miners will have health cards and will utilize the services." Another said that the employment picture will be the "same as now--the load will increase but the same number of persons can handle it due to automation." One employer representative felt that the number of positions will increase. She said "Somebody's got to do the work."

At the national level, certified laboratory assistants were not projected by the Bureau of Labor Statistics, but as reported previously, "medical laboratory workers" were placed together and a very low 1.9 percent per year rate of increase was projected for them (78: 48). The Health Resources Administration projected a substantial increase in the numbers of CLA's of 232.3 percent from 1970 to 1980, and of 84.9 percent from 1980 to 1990. According to the HRA, the number of CLA's in the nation will increase from 6,700 in 1970, to 22,260 in 1980, to 41,160 in 1990, which is a rate of increase only slightly less than that projected for dental assistants and dental laboratory technicians (64: 143). However, the ratio of CLA's to population at the national level indicates that the seven-county area should have only 25 CLA's, or slightly more than one-third of the 71 in the current supply. The Appalachia Educational Laboratory's basic projection for CLA's is based on a 6.0 percent annual growth rate due to increased demand. This is approximately the rate required to meet the employers' future budget estimates, which appears to be the most accurate indicator of CLA's growth rate. The minimum projected increase rate is 3.8 percent, the average increase in budgeted numbers during the past

two years. The maximum projected increase is 11.0 percent, the rate estimated by the employers.

The turnover rate reported by most employers was low. The HRA projected number of graduates to active supply is from 19.5 percent in 1977 to 11.6 percent in 1987. However, the seven-county area apparently does not have to catch up to national trends with CLA's, so the percent of graduates would not have to be that high at the local level. The selected effective replacement rate, or percent of newly trained CLA's to be placed each year was 6.0 percent of supply.

The CLA projection is therefore based on a 6.0 percent effective replacement rate and maximum, basic, and minimum demand increases of 11.0 percent, 6.0 percent, and 3.8 percent.

Replacement Needs

As indicated in Table CLA-1, the basic projection has the number of CLA's increasing from 71 in 1977 to 127 in 1987, an increase of 178.9 percent over current supply. The minimum and maximum projections indicate that by 1982 there will be between 86 and 120 CLA's in the seven-county area, and the basic projection indicates that the number will most likely be 95.

The basic projection indicates that between 11 and 19 newly-trained CLA's will have to be recruited each year. These graduates may be obtained from new training schools within the area, or from existing sources outside the seven counties.

Table CLA-1

Projected Number of Certified Laboratory Assistants Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected** Annual Need		
	Max	Bas	Min	Max	Bas	Min
1977	71	71	71			
1978	78	75	74	14	11	10
1979	87	80	76	17	13	9
1980	97	85	79	19	13	11
1981	108	90	82	21	14	11
1982	120	95	86	23	14	12
1983	133	101	89	25	16	12
1984	147	107	92	27	17	12
1985	164	113	96	32	17	13
1986	182	120	99	34	18	13
1987	202	127	103	38	19	14

*Supply: Total number of persons required in work force each year, based on an 11.0% (maximum) 6.0% (basic), and 3.8% (minimum) increase in demand plus a 10% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

REGISTERED DIETITIAN

Occupational Description

Dietitians plan nutritious and appetizing meals to help people maintain or recover good health. They also supervise the food service workers who prepare and serve the meals, manage purchases and keep the accounts, and give advice on good eating habits. Administrative dietitians form the largest group in this occupation; the others are clinical, teaching, and research dietitians.

Administrative dietitians apply the principles of nutrition and sound management to large-scale meal planning and preparation, such as that done in hospitals, universities, schools, and other institutions. They supervise the planning, preparation, and service of meals; select, train, and direct food-service supervisors and workers; budget for and purchase food, equipment, and supplies; enforce sanitary and safety regulations; and prepare records and reports. Dietitians who are directors of a dietetic department also decide on departmental policy; coordinate dietetic service with the activities of other departments; and are responsible for the development and management of the dietetic department budget, which in large organizations may amount to millions of dollars annually.

An increasing number of dietitians work as consultants to hospitals and to health-related facilities. Others act as consultants to commercial enterprises, including food processors and equipment manfacturers.

A bachelor's degree, preferably with a major in foods and nutrition or institution management, is the basic educational requirement for dietitians. This degree can be earned in more than 250 colleges and universities, usually in departments of home economics. College courses usually required are in food and nutrition, institution management, chemistry, bacteriology, physiology, and related courses such as mathematics, data processing, psychology, sociology, and economics.

For a dietitian to qualify for professional recognition, the American Dietetic Association (ADA) recommends the completion after graduation of an approved dietetic internship or an approved individual traineeship program. The internship lasts 6 to 12 months and the traineeship program 1 to 2 years. Both programs combine clinical experience under a qualified dietitian with some classroom work. (Excerpted from U. S. Department of Labor, Occupational Outlook Handbook, 1976-77 Edition [76: 485-486].)

Sources of Data

The data pertaining to registered dietitians came from the 14 health service agencies in the seven counties which reported employing them. There was also information available from national sources.

The projections of numbers was not only difficult because of small numbers, but was especially problematic because most employers reported using them on a consultant basis. The determination of the present number of full-time-equivalent dietitians was almost impossible.

Supply Characteristics

Four employers reported nine full-time registered dietitians, and the other ten reported using consultants equivalent to 1.6 FTE. However, each consultant is probably not employed a full 40 hours per week, so 12 registered dietitians was the number used for current supply.

Demand Characteristics

The mean increase in budgeted numbers of dietitians over the past five years was 16.7 percent, and the changes for each year were 0.0 percent in 40.0 percent in 1974, 26.7 percent in 1975, and 0.0 percent in 1976. The irregularity is caused by the small total number. In order to meet current demand optimally, an increase in numbers of 26.3 percent, or 2.5 FTE was reported by the employers.

When asked to estimate the budgeted numbers in the next two, five, and ten years, the employers responded with 15.8 percent, 36.8 percent, and 47.4 percent increases over the present number budgeted.

At the national level, the Bureau of Labor Statistics projects that the number of employed dietitians will increase by 32.0 percent between 1972 and

1985, or a low annual increase rate of 2.2 percent. The projection by Health Resources Administration indicates an increase of 18.8 percent between 1970 and 1980, and of 23.0 percent between 1980 and 1990. This is the lowest rate which HRA projected for any occupation. However, the dietitian to national population ratio indicates that the seven-county area should be served by approximately 27 dietitians, more than twice the number now available.

The basic projection includes a high initial demand rate of 26.3 percent for two years, followed by a rate of 7.5 percent for the next eight years. The latter figure is that required to maintain the employer's estimated budget increase.

The maximum demand rate is 16.7 percent, the historical increase budgeted number of dietitians. The minimum rate is 7.5 percent, based on the employer's estimated future number to be budgeted.

The employers reported a very low turnover rate for dietitians. Nationally, additions to the supply from graduates is equal to about 7.0 percent of the current supply, so that rate was used to determine the number of vacancies to be filled by newly trained dietitians.

Training Requirements

The small number of registered dietitians required to meet demands combined with a low turnover rate was responsible for producing a very low rate of training needs.

As shown by Table RD-1, the basic projection indicated that the current supply of 12 registered dietitians would grow to 29 by 1987. Between two and four newly trained dietitians will be required to replenish the supply each year of the ten-year span.

As mentioned previously, these projections are highly tentative. They are based on past national and local employment trends, and local or national

Table RD-1

Projected Number of Registered Dietitians Required to Meet Losses from Supply and Increased Demand

Year	Projected* Supply Needed			Projected* Annual Need		
	Max	Bas	Min	Max	Bas	Min
1977	12	12	12			
1978	14	15	13	3	4	2
1979	16	16	14	3	2	2
1980	19	18	15	4	3	2
1981	22	19	16	4	2	2
1982	26	20	17	6	2	2
1983	30	22	19	6	3	3
1984	35	23	20	7	3	2
1985	41	25	21	8	4	2
1986	48	27	23	10	4	3
1987	56	29	25	11	4	4

*Supply: Total number of persons required in work force each year based on a 16.7% (maximum), an increase of 26.3% for one year, and a 7.5% for the next nine years (basic), and a 7.5% (minimum) increase in demand plus a 7.0% turnover or replacement rate.

**Need: Number of newly-trained persons required to replenish supply, based on demand and replacement assumptions.

policy decisions could alter the employment picture completely. For example, if all nursing homes were required to employ a full-time dietitian, the required number would be double the current supply.

PHYSICIAN'S ASSISTANT

Occupational Description

As an assistant to the practicing physician, the PA has the knowledge and competencies to (1) elicit a comprehensive health history; (2) perform a comprehensive physical examination; (3) perform simple diagnostic laboratory determinations and understand and use their values; (4) perform basic treatment procedures; and (5) make an appropriate clinical response to commonly encountered emergency care situations.

This new type of health professional is a phenomenon of the 1960s and the leadership of such institutions as Duke University, the University of Colorado, and the University of Washington. Demonstrations by these institutions in how to prepare well-qualified personnel to provide a substantial body of hertofore only or principally doctor-performed functions attracted substantial support from other innovative physicians, nurses, and educators.

These efforts also caught the imagination of the health manpower policy makers in the Department of Health, Education, and Welfare and the National Institutes of Health, resulting in decisions which made substantial monies available for further development and evaluation of mid-level practitioner programs, both for nurse practitioners and for physician's assistants.

In the past ten years over 70 physician's assistant programs have become operational. The majority of these programs are preparing assistants to the primary care physician, with a much smaller number preparing surgeon's assistants, and assistants for various specialties such as urology, orthopedics, otolarynology, allergy, radiology, pathology, anesthesiology, and the like.

The House of Delegates, AMA, has adopted the following definition of the physician's assistant:

> *The physician's assistant is a skilled person qualified by academic and practical training to provide patient services under the supervision and direction of a licensed physician who is responsible for the performance of that assistant.*

The length of the educational program is determined largely by its objectives and complementing student selection criteria. Although they are not restricted to this time frame, programs are commonly 24 months in length with principal, if not total, focus on clinical didactic and clinical practicum instruction. Programs range from 12-45 months in length. (Excerpted from American Medical Association, Allied Medical Education Directory, 6th Edition [7: 373, 389].)

Sources of Data

No numerical projection could be made for physician's assistants because (1) the number in current supply could not be obtained, and (2) the future role of physician's assistants is currently changing as described below. Neither the Bureau of Labor Statistics nor the Health Resources Administration have reported projections concerning physician's assistants, so far as the AEL research team was able to determine.

Following is national, state, and local information concerning physician's assistants.

Physician's Assistant Profile

Dr. Donald W. Fisher, Executive Director of the American Academy of Physicians' Assistants and the Association of Physician Assistant Programs, presented a paper entitled "Physician Assistant: A Profile of the Profession" at the Conference on Current Information on Health Manpower in 1975 based upon a survey of graduates and student physician's assistants (25:8). He concluded that "the data tabulated substantiates earlier publications describing the physician's assistant." In general, the average physician's assistant is 30 years old at graduation, is white and male. The majority (77 percent) practice in primary care and in communities with a population of less than 50,000. The average work week is 48 hours long, and the annual compensation after three years of employment is generally between $15,000 and $20,000. Seventy-eight percent of physician's assistant practices are stable. Those who change employment change on an average of 1.3 times.

It would appear from these data obtained early in the development of this new profession that physician's assistants are concentrating in primary care medicine in the more medically underserved areas. There does not appear to be

an employment problem, but there are many more positions available than there are individuals to fill them. The salaries of the graduates range from a starting salary of from $12,000 to $14,000 per annum to $15,000 to $20,000 at the end of three years in practice.

A later study by Richard M. Scheffler found that physician's assistants were predominately male (81.4 percent) Caucasians (87.0 percent), and with an average age of 32.0 years (53: 1-4). Nearly one-half (46.9 percent) were employed in the Middle and South Atlantic Census Region. The heaviest concentration of physician's assistants exists in metropolitan areas (68.9 percent).

Status in West Virginia. On March 11, 1976, the West Virginia Legislature enacted Senate Bill No. 168 (Appendix D) which amended and reenacted Article 3-A, Chapter thirty of the Code of West Virginia relating to physician's assistants. Prior to enactment of Senate Bill 168, the Medical Licensing Board of West Virginia had licensed "approximately 30 to 40 physician's assistants." The names of these individuals nor the number of applications which were being held until new regulations were prepared and approved, could not be obtained.

The president of the West Virginia Chapter of the American Association of Physician Assistants was most cooperative. He indicated that the State Chapter had approximately 31 graduate members. By checking the mailing address of the members, it was determined that approximately one-third (29.0 percent) resided in the seven-county area.

Article 3A-1, Chapter 30, defined Type 'A' physician's assistant as "an assistant to a primary care physician who is a graduate of an approved program of instruction in primary health care, who has passed the national certification examination and is qualified to perform direct patient care services under the supervision of the primary care physician." Type 'B' physician's assistant was defined as "an assistant to the physician who is a graduate of an approved

program for instruction in a recognized clinical specialty or has received training from a physician adequate to qualify him to perform patient services in that specialty as defined by the supervising physician."

The supervising physician's responsibilities, according to Article 3A-6, include "observing, directing and evaluating the work, records and practices performed by the physician assistant pursuant to this article. The supervising physician shall notify the medical licensing board, in writing, of any termination of the employment of his physician assistant within ten days of said termination. The legal responsibility for any physician assistant shall remain that of the employing physician or physicians at all times including occasions when the assistant, under the direction and supervision of the employing physician or physicians, aids in the care and treatment of patients in health care facilities. Such health care facilities shall not be legally responsible for the actions or omissions of the physician assistant, unless such physician assistant is an employee of the facility.

The following limitations on the employment of physician's assistants were specified in Article 3A-8:

(a) A supervising physician shall not employ at any one time more than two physician assistants.

(b) Physician assistant shall not sign prescriptions. He shall not perform any service which his employing supervising physician is not qualified to perform. Further, he shall not perform any service which is not included in his job description and approved as provided in section five of this article.

(c) Nothing in this article shall be construed to authorize physician assistants to perform those specific functions and duties delegated by law to those persons licensed as chiropractors, dentists, dental hygienists, optometrists, pharmacists, or certified as nurse anesthetists.

One specific function of medical licensing board of West Virginia was to "promulgate rules and regulations governing the extent to which physician assistant may function within this state."

On May 2, 1977, a draft of the Regulations for Physician's Assistants was approved by the medical licensing board. (See Appendix E for a copy of these regulations.) The medical licensing board shall convene a hearing on Monday, June 27, for the purpose of taking evidence pertaining to the filing of regulations governing certification of physician's assistants.

The present draft places the following limitations on the employment and scope of duties of physician's assistants.

(a) A supervising physician shall not employ at any one time more than two physician's assistants.

(b) Physician's assistants shall not sign prescriptions.

(c) Physician's assistants shall not perform any service which his employing supervising physician is not qualified to perform.

(d) Physician's assistants shall not sign orders to be countersigned later by the employing supervising physician.

(e) Physician's assistants shall not perform any service which is not included in his job description and approved by the Board.

Another function of the medical licensing board will be to "compile and publish an annual report that includes a list of currently certified physician assistants, their employers and location in the state; a list of approved programs; the number of graduates per year of such approved programs and the number of physician assistants from other states practicing in West Virginia."

This will be invaluable for those in the future who attempt to project the supply and demand of physician's assistants.

SECTION III

SUMMARY AND RECOMMENDATIONS

INTRODUCTION

The projection of training needs for each of 16 allied health and nursing occupations for a seven-county area of West Virginia was completed during the winter and spring of 1977. The general procedure, as described in Section I of this report, was to determine the present number of employees in each occupation, usually through interviews with employers, and then to project future employment trends and resulting training needs. The latter projection was based on information obtained from local employers and on national trends. The resulting projections, along with background information and descriptions of the occupations, are included in Section II.

The purpose of Section III is to summarize the results presented in the previous section and to offer some recommendations for further studies.

SUMMARY OF PROJECTIONS

Much diversity was found among the 16 occupations. Some had relatively stable employment trends, such as physical therapists. Others, such as nuclear medicine technologists, were expanding rapidly, although small numbers of potential employees were involved. The results of all 16 projections are summarized in Table 1 of this section.

The occupation with the greatest number of employees, or current supply, was registered nurses. In fact, there are currently 1,342 registered nurses in the seven-county area, compared to 1,358 persons employed in all other allied health and nursing occupations for which current supply figures are given in Table 1. The occupation with the second largest number of current employees was licensed practical nurses with 769, and then radiologic technologists with 106. Occupations with relatively small numbers of employees were cytotechnologists with 6, nuclear medicine technologists

Table 1

Training Needs for Sixteen Allied Health and Nursing Occupations According to Basic Projection

Training Available in Seven-County Area

Occupation	Current Supply 1977	Supply Percent Increase 1977-1987	Number Newly-Trained Employees in: 1979	1983	1987
Registered Nurse	1,342	79.1	298	377	476
Certified RN Anesthetist	68	105.9	10	13	18
Licensed Practical Nurse	769	63.0	106	128	155
Operating Room Technician	71	140.8	13	19	27
Radiologic Technologist	106	181.1	29	44	67
Cytotechnologist	6	66.7	2	1	2
Medical Laboratory Technician	41	63.4	4	6	6
Medical Record Technician	32	90.6	5	7	10
Dental Hygienist	75	128.0	18	26	35

Training Not Available in Seven-County Area

	Current Supply 1977	Supply Percent Increase 1977-1987	Number Newly-Trained Employees in: 1979	1983	1987
Physical Therapist	31	61.3	4	6	7
Respiratory Therapist	13	184.6	4	5	6
Nuclear Medicine Technologist	11	381.8	4	6	10
Medical Technologist	52	240.4	13	22	37
Certified Laboratory Assistant	71	78.9	13	16	19
Registered Dietitian	12	141.7	2	3	4
Physician's Assistant	(data not available for projection--see text)				

with 11, registered dieticians with about 12, and respiratory therapists with 13 employees at the time of interview. As explained in Section II, sufficient data could not be made available to permit a projection of training needs for physician's assistants.

Section II of the report includes year-by-year projections of the number of employees expected in each occupation. Table 1 of this section includes a listing of the percent increase in the number of employees between 1977 and 1987, based on the projections given in Section II. The occupation with the highest rate was nuclear medicine technologist with a 381.8 percent increase. In other words, there will be 53, or more than four times as many nuclear medicine technologists in 1987 as there are in 1977, according to the basic projection given in Section II.

The occupation with the second highest rate was medical technologist, with a 240.4 percent increase, and that was followed by respiratory therapist and radiologic technologist with more than 180.0 percent increase. The occupations with the lowest rate were physical therapist with a 61.3 percent increase, licensed practical nurse with a 63.0 percent increase, and medical laboratory technician with a 63.4 percent increase.

According to the basic projection, there will be 298 vacancies filled by newly trained registered nurses in 1979, 377 in 1983, and by 1987, 476 nursing graduates will be required to meet employment needs. In comparison, only two newly trained cytotechnologists or registered dieticians will be required in 1979 and only four each of the following: medical laboratory technician, physical therapist, respiratory therapist, and nuclear medicine technologist.

If these projections are assumed to have sufficient credibility, a decision facing health planners is whether programs with small supply

requirements can be economically provided at the local level. One solution, perhaps too obvious, is to train one specialized group in one area of the state and another specialty in another area. Hopefully, these projections will be judged to have sufficient credibility to support decisions of that magnitude. The support should be found within the report; the decisions are beyond its scope.

RECOMMENDATIONS

The fourth objective described in Section I was to suggest procedures which might be used for a state-wide manpower projection. The AEL research team feels that the selected procedures did provide information concerning trainj g needs which was much better than casual guesses or even informed estimates. The team therefore feels that the procedures should have state-wide application. However, there were problems and the projections can be "tightened up" in a number of ways.

Conceptualization of a Model

The "model" for projection grew with the study, and according to the availability of data as the study progressed. A future state-wide study might have more conceptual support. For example, a more detailed investigation of the many factors which impinge on supply would have benefited the study, especially if supporting data could have been found. However, a model should not become so sophisticated that it becomes overbearing or unwieldy. An experienced statistician or administrator develops a feel for data, and human judgment should not be completely displaced by theoretical constructs.

Collection of Data

A variety of procedures have been tried, e.g., personal interview, telephone interview, and questionnaire, in order to determine the procedures most efficient in projecting needs. More than 1,000 telephone calls and 150 discussions with individuals were required to provide the best available data for projections.

Generally, data derived through use of questionnaires were not found to be as valid as that resulting from interviews, since the return rate was usually low. Most problems with data collection occurred when interview schedule forms had to be left with those in the health service agencies who were to obtain the information.

Quite sophisticated prediction procedures requiring the simultaneous use of several variables were abandoned early in the project since the available data were spotty. There were considerably more available data for nurses than for registered dietitians, for example, and one set of classical procedures could not apply to all 16 occupations.

The importance of person-to-person contact was considered a most important aspect of the project. AEL staff had agreed not to request information which would require the responding agencies large amounts of time to obtain. Therefore, the staff applied little pressure. In spite of the low-key approach, or perhaps because of it, many persons did give freely of their resources once they understood the importance of the project. In one case, a computer programmer spent about one week analyzing data at no cost of his time to the project. Almost without exception, people gave freely of their time and, hopefully, their efforts will be rewarded through effective use of the information resulting from the data collection effort.

State-wide collection of data will offer some logistic problems, such as completing interviews over the entire state, but these are offset by economy of scale. Some of the data, for example, can be obtained at the state level through cooperation of the Department of Health personnel and use of their facilities. Whoever completes a state-wide projection should plan on using their resources.

Cooperating Agencies

The support of a number of licensing, planning, and service agencies is essential to completion of a state-wide manpower project. The names of these agencies have been mentioned throughout the report and little information can be obtained without their understanding and support.

Continuation of Projection Studies

A projection of manpower needs based on data from one year, which was essentially the case for the AEL projections, is risky at best. Most institutions will use data collected from previous projection efforts along with current data in order to prepare future objections. Data from previous projections were not available. In fact, no data at all were available from past years except what the personnel officers were able to provide concerning budgeted positions.

The projections should be repeated and sharpened so there will be minimum waste of manpower and of human potential. To that end, there should be some common repository for manpower data. The system being set in motion by the State Department of Health is a good start, but according to their own description, their data are more "present status" oriented than "future need" in nature and purpose. Perhaps they or another health agency with

state-wide responsibility could take this initiative in the collection of manpower planning data.

Required Time and Resources for State-wide Projections

Financial support, time, and people are required for a large study. Approximately $200,000 would be required for a state-wide projection study of the type contained in this report. The study would provide a projection for each of the planning areas of the state, as well as a total-state projection. The study should require 12 to 24 months, depending on funding level and desired outcomes.

The importance of qualified and experienced staff should not be overlooked. Someone with training in and experience with projection techniques should be involved with, if not the director of, the study. Wide-scale data collection offers special problems, and someone experienced with survey research should be involved with the study. Someone familiar with data processing and computer analysis would be helpful, since the large quantity of data could be handled more efficiently and accurately through machine processing. Finally, the selected agency or personnel in that agency should have successful experience in dealing with people. Success or failure is frequently dependent on human relations, and the outcome of a state-wide projection of training needs will hinge on successful working relationships with the many individuals and agencies in the state.

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APPENDICES

APPENDIX A

Employing Agencies

EMPLOYING AGENCIES

Hospitals

Boone Memorial Hospital
Route 2
Madison, WV 25130

Charleston General Hospital
Brooks Street & Elmwood Avenue
Charleston, WV 25325

Charleston Memorial Hospital
3200 MacCorkle Avenue, S.E.
Charleston, WV 25304

Eye & Ear Clinic of Charleston
1306 Kanawha Boulevard, E.
Charleston, WV 25301

Gordon Memorial Hospital
400 Church Street
Spencer, WV 25276

Highland Hospital
300 56th Street, S.E.
Charleston, WV 25304

Kanawha Valley Memorial Hospital
1014 Virginia Street, E.
Charleston, WV 25301

Montgomery General Hospital
Montgomery, WV 25136

Oak Hill Hospital
Main Street
Oak Hill, WV 25901

Frank E. Pick Memorial Hospital
30 MacCorkle Avenue, S.W.
South Charleston, WV 25303

Roane General Hospital
200 Hospital Drive
Spencer, WV 25276

St. Francis Hospital
519 Donnally Street
Charleston, WV 25301

Spencer State Hospital
Box 160
Spencer, WV 25276

Staats Hospital
123 Washington Street, W.
Charleston, WV 25302

H. J. Thomas Memorial Hospital
4605 MacCorkle Avenue, S.W.
South Charleston, WV 25309

Industrial Sites

AVTEX Fibers, Inc.
Nitro, WV 25143

C & P Telephone Company
1500 MacCorkle Avenue, S.E.
Charleston, WV 25314

E. I. DuPont Company
Belle, WV 25015

FMC Corporation Industrial
Chemical Division
MacCorkle Avenue, S.W. at Rhodes
Street
South Charleston, WV 25303

FMC Corporation Chemical Industrial Division
P. O. Box 547
Nitro, WV 25143

Hygeia Facilities Foundation, Inc.
Whitesville, WV 25209

Monsanto Company
Nitro, WV 25143

Union Carbide Corporation
Metals Division
Alloy, WV 25002

Union Carbide Corporation

South Charleston Plant
437 MacCorkle Avenue, S.W.
South Charleston, WV 25314

Institute Plant
Institute, WV 25112

Technical Center
South Charleston, WV 25303

Medical Laboratories

Atlas Clinical Laboratory
3416 MacCorkle Avenue, S.E.
Charleston, WV 25304

Boone Memorial Hospital
Route 2
Madison, WV 25130

Cabin Creek Clinical Laboratory
Cabin Creek, WV 25035

Cabin Creek Medical Clinic
Box 99
Dawes, WV 25054

Cedar Grove Medical Center
George Street
Cedar Grove, WV 25039

Charleston Area Medical Center
GENERAL DIVISION
Box 1393
Charleston, WV 25325

Charleston Area Medical Center
MEMORIAL DIVISION
3200 MacCorkle Avenue, S.E.
Charleston, WV 25304

Clinical Laboratories of West Virginia, Inc.
Brooks Medical Building
Charleston, WV 25301

Coal Valley Medical Center
Box 287
Smithers, WV 25186

Cross Lanes Medical Corporation
5476 Big Tyler Road
Charleston, WV 25312

Eye & Ear Clinic of Charleston
1306 Kanawha Boulevard, E.
Charleston, WV 25301

FMC Corporation Industrial Chemical Division
Medical Laboratory
MacCorkle Avenue, S.W. at Rhodes Street
South Charleston, WV 25303

Fayette Clinic
Lochgelly, WV 25866

Gordon Memorial Hospital
400 Church Street
Spencer, WV 25276

Harts Medical Center
Harts, WV 25524

Hillside Medical Laboratory
Charlton Heights, WV 25040

Kanawha Valley Memorial Hospital
1014 Virginia Street, E.
Charleston, WV 25301

Lincoln Primary Care Center Laboratory
P. O. Box 607
Hamlin, WV 25523

Medical Arts Clinical Laboratory
210 Medical Arts Building
Charleston, WV 25301

Montgomery General Hospital
6th & Washington
Montgomery, WV 25136

New Haven Medical Clinic
Ansted, WV 25812

Nitro Medical Center
4114 First Avenue
Nitro, WV 25143

Oak Hill Hospital
430 Main Street
Oak Hill, WV 25901

Pat Shaw Vic, Inc. Clinical Laboratory
637 Virginia Street, W.
Charleston, WV 25302

Frank E. Pick Memorial Hospital
30 MacCorkle Avenue, S.W.
South Charleston, WV 25303

Raleigh Boone Medical Center
Box 187
Whitesville, WV 25209

Roane General Hospital
Box 550, Parkersburg Road
Spencer, WV 25276

St. Francis Hospital
519 Donnally Street
Charleston, WV 25301

Laboratory of Marvin Schles, D.O.
Box 237, Legg Star Route
Sissonville, WV 25320

Dr. Robert H. Skaff Medical Clinic
Glass Addition
Poca, WV 25159

J. Loren Smith Laboratory, D.O.
Alum Creek, WV 25003

Spencer State Hospital
Box 160
Spencer, WV 25276

Staats Hospital
123 Washington Street, W.
Charleston, WV 25302

H. J. Thomas Memorial Hospital
4605 MacCorkle Avenue, S.W.
South Charleston, WV 25309

Union Carbide Chemicals & Plastics
Clinical Laboratory, Box 8004
437 MacCorkle Avenue, S.W.
South Charleston, WV 25314

Union Carbide-Institute Plant
Medical Laboratory, Box 2831
Institute, WV 25112

Union Carbide Technical Center
Medical Laboratory, Box 8361
South Charleston, WV 25303

Velasquez Clinic Laboratory
Eleanor, WV 25070

West Virginia Rehabilitation Center
Institute, WV 25112

Womens Health Center
3101 MacCorkle Avenue, S.E.
Charleston, WV 25304

Nursing Homes

Christian Nursing Home
122 2nd Avenue
Fayetteville, WV 25840

Green Acres
Maple Road
Fayetteville, WV 25840

Harrell Memorial Nursing Home
1514 Virginia Street, E.
Charleston, WV 25311

Hill Top Nursing Home
Hill Top, WV 25855

Lexington House of Kanawha City
3819 Chesterfield Avenue
Charleston, WV 25304

Mountain State Nursing Home
1301 Virginia Street, E.
Charleston, WV 25301

Riverside Nursing & Convalescent Center
6500 MacCorkle Avenue, S.W.
St. Albans, WV 25177

School Systems

Boone County
69 Avenue, B
Madison, WV 25130

Clay County
P. O. Box 45
Clay, WV 25043

Fayette County
Fayette Avenue
P. O. Box 239
Fayetteville, WV 25840

Kanawha County
200 Elizabeth Street
Charleston, WV 25311

Lincoln County
P. O. Box 437
Hamlin, WV 25523

Putnam County
Winfield, WV 25213

Roane County
108 Chapman Avenue
Spencer, WV 25276

Others

Cerebral Palsy Clinic
Frute School Building
509 Lee Street, E.
Charleston. WV 25301

West Virginia Department of Health
1800 Washington Street, E.
Charleston, WV 25311

West Virginia Department of Mental Health
1800 Washington Street, E.
Charleston, WV 25311

West Virginia Department of Vocational Rehabilitation
P & G Building
2019 Washington Street, E.
Charleston, WV 25305

West Virginia Department of Welfare
1900 Washington Street, E.
Charleston, WV 25311

APPENDIX B

Employer Interview Schedules and
Dental Hygienist Survey Form

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: REGISTERED NURSE

A. Do you presently employ or contract for the services of registered nurses?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of registered nurses within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female registered nurses (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for registered nurses at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977____, January 1, 1976____, January 1, 1975____,
January 1, 1974____, January 1, 1973____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for registered nurses? _____ %

6. What is the total number of registered nurses you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of registered nurses in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: CERTIFIED R.N. ANESTHETIST

A. Do you presently employ or contract for the services of certified R.N. anesthetists?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of certified R.N. anesthetists within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female certified R.N. anesthetists (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for certified R.N. anesthetists at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 _____, January 1, 1976_____ , January 1, 1975_____ ,
January 1, 1974 _____, January 1, 1973_____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for certified R.N. anesthetists? _____%

6. What is the total number of certified R.N. anesthetists you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of certified R.N. anesthetists in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____%	_____%
Five years from now	_____%	_____%
Ten years from now	_____%	_____%

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: LICENSED PRACTICAL NURSE

A. Do you presently employ or contract for the services of licensed practical nurses?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of licensed practical nurses within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female licensed practical nurses (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for licensed practical nurses at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 _____, January 1, 1976 _____, January 1, 1975 _____,
January 1, 1974 _____, January 1, 1973 _____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for licensed practical nurses? _____ %

6. What is the total number of licensed practical nurses you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of licensed practical nurses in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: OPERATING ROOM TECHNICIAN

A. Do you presently employ or contract for the services of operating room technicians?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of operating room technicians within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female operating room technicians (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for operating room technicians at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 _____, January 1, 1976 _____, January 1, 1975 _____,
January 1, 1974 _____, January 1, 1973 _____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for operating room technicians? _____%

6. What is the total number of operating room technicians you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of operating room technicians in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____%	_____%
Five years from now	_____%	_____%
Ten years from now	_____%	_____%

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: REGISTERED RADIOLOGIC TECHNOLOGIST (Include those who are eligible for State Licensure under Senate Bill # 483.)

A. Do you presently employ or contract for the services of registered radiologic technologists?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of registered radiologic technologists within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female registered radiologic technologists (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for registered radiologic technologists at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 ____, January 1, 1976 ____, January 1, 1975 ____,
January 1, 1974 ____, January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for registered radiologic technologists? ____ %

6. What is the total number of registered radiologic technologists you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of registered radiologic technologists in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer_____
Interviewee_____
Date_____
Interviewer_____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: CYTOTECHNOLOGIST

A. Do you presently employ or contract for the services of cytotechnologists?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of cytotechnologists within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female cytotechnologists (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for cytotechnologists at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977____ , January 1, 1976____ , January 1, 1975 ____,
January 1, 1974____ , January 1, 1973____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for cytotechnologists?
_____%

6. What is the total number of cytotechnologists you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of cytotechnologists in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____%	_____%
Five years from now	_____%	_____%
Ten years from now	_____%	_____%

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: MEDICAL LABORATORY TECHNICIAN (Associate degree plus certification/registry)

A. Do you presently employ or contract for the services of medical laboratory technicians?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of medical laboratory technicians within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female medical laboratory technicians (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for medical laboratory technicians at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977____ , January 1, 1976 ____ , January 1, 1975 ____
January 1, 1974____ , January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for medical laboratory technicians?_____ %

6. What is the total number of medical laboratory technicians you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of medical laboratory technicians in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: MEDICAL RECORD TECHNICIAN

A. Do you presently employ or contract for the services of medical record technicians?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of medical record technicians within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female medical record technicians (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for medical record technicians at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 ____, January 1, 1976 ____, January 1, 1975____,
January 1, 1974 ____, January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now ____
Five years from now ____
Ten years from now ____

5. What is your present annual percent of replacement or turn-over-rate for medical record technicians? _____%

6. What is the total number of medical record technicians you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of medical record technicians in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____%	_____%
Five years from now	_____%	_____%
Ten years from now	_____%	_____%

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: LICENSED DENTAL HYGIENIST

A. Do you presently employ or contract for the services of licensed dental hygienists?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of licensed dental hygienists within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female licensed dental hygienists (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for licensed dental hygenists at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 _____, January 1, 1976_____ , January 1, 1975 _____ ,
January 1, 1974 _____, January 1, 1973_____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for licensed dental hygienists? _____%

6. What is the total number of licensed dental hygienists you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of licensed dental hygienists in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____%	_____%
Five years from now	_____%	_____%
Ten years from now	_____%	_____%

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: LICENSED PHYSICAL THERAPIST

A. Do you presently employ or contract for the services of licensed physical therapists?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of licensed physical therapists within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female licensed physical therapists (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for licensed physical therapists at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 ____, January 1, 1976 ____, January 1, 1975____ ,
January 1, 1974____, January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for licensed physical therapists? ____ %

6. What is the total number of licensed physical therapists you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of licensed physical therapists in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: RESPIRATORY THERAPIST

A. Do you presently employ or contract for the services of respiratory therapists?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of respiratory therapists within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female respiratory therapists (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for respiratory therapists at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 _____, January 1, 1976 _____, January 1, 1975_____,
January 1, 1974 _____, January 1, 1973 _____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for respiratory therapists? _____ %

6. What is the total number of respiratory therapists you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of respiratory therapists in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer_____
Interviewee_____
Date_____
Interviewer_____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: NUCLEAR MEDICINE TECHNOLOGIST

A. Do you presently employ or contract for the services of nuclear medicine technologists?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of nuclear medicine technologists within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female nuclear medicine technologists (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for nuclear medicine technologists at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977____ , January 1, 1976 ____, January 1, 1975____ ,
January 1, 1974____ , January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for nuclear medicine technologists? ____ %

6. What is the total number of nuclear medicine technologists you would need to provide optimum health services for your clients? _____.

7. Based upon your professional judgement, what do you feel are the future prospects of employment of nuclear medicine technologists in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: MEDICAL TECHNOLOGISTS (Baccalaureate level plus certification/registry)

A. Do you presently employ or contract for the services of medical technologists?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of medical technologists within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female medical technologists (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for medical technologists at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 ____, January 1, 1976 ____, January 1, 1975 ____,
January 1, 1974 ____, January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for medical technologists?
_____ %

6. What is the total number of medical technologists you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of medical technologists in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: CERTIFIED LABORATORY ASSISTANT (One year plus certification/registry)

A. Do you presently employ or contract for the services of certified laboratory assistants?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of certified laboratory assistants within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female certified laboratory assistants (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for certified laboratory assistants at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 ____, January 1, 1976 ____, January 1, 1975 ____,
January 1, 1974 ____, January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for certified laboratory assistants? _____ %

6. What is the total number of certified laboratory assistants you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of certified laboratory assistants in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____%	_____%
Five years from now	_____%	_____%
Ten years from now	_____%	_____%

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: REGISTERED DIETICIAN

A. Do you presently employ or contract for the services of registered dieticians?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of registered dieticians within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female registered dieticians (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for registered dieticians at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 ____, January 1, 1976 ____, January 1, 1975____,
January 1, 1974 ____, January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for registered dieticians? ____ %

6. What is the total number of registered dieticians you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of registered dieticians in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____ %	_____ %
Five years from now	_____ %	_____ %
Ten years from now	_____ %	_____ %

Employer _____
Interviewee _____
Date _____
Interviewer _____

EMPLOYER INTERVIEW SCHEDULE

OCCUPATION: PHYSICIAN ASSISTANT

A. Do you presently employ or contract for the services of physician assistants?

Yes ☐ No ☐ (If Yes, skip B and complete interview schedule. If No, ask question B.)

B. Do you anticipate utilizing the services of physician assistants within the next 12 months?

Yes ☐ No ☐ (If Yes, ask questions 4, 6, and 7. If No, stop here.)

INSTITUTION/EMPLOYER DATA

1. How many male and how many female physician assistants (FTE) are presently employed in your institution?

_____ Males _____ Females

2. Do you have any vacancies for physician assistants at the present time?

Yes ☐ No ☐ If Yes, how many (FTE)? _____

3. What was the number of budgeted positions (FTE) as of:

January 1, 1977 ____, January 1, 1976 ____, January 1, 1975 ____,
January 1, 1974 ____, January 1, 1973 ____

4. Estimate the number of budgeted positions (FTE):

Two years from now _____
Five years from now _____
Ten years from now _____

5. What is your present annual percent of replacement or turn-over-rate for physician assistants?
_____%

6. What is the total number of physician assistants you would need to provide optimum health services for your clients? _____

7. Based upon your professional judgement, what do you feel are the future prospects of employment of physician assistants in the seven-county area (Kanawha, Fayette, Boone, Lincoln, Roane, Clay, and Putnam)?

	Will Increase	Will Decrease
Two years from now	_____%	_____%
Five years from now	_____%	_____%
Ten years from now	_____%	_____%

DENTAL HYGIENIST SURVEY

How many full-time equivalent (FTE) licensed dental hygienists are presently employed in your office?

Number of males ___ Average age ___
Number of females ___ Average age ___

How many FTE licensed dental hygienists do you project your office will employ during the next two years due to

Turn-over rate (replacements) _____?
Growth and/or increased services _____?

How many FTE licensed dental hygienists do you project your office will employ during the next five years due to

Turn-over rate (replacements) _____?
Growth and/or increased services _____?

How many FTE licensed dental hygienists do you project your office will employ during the next ten years due to

Turn-over rate (replacements) _____?
Growth and/or increased services _____?

The number of active DENTISTS in the seven-county area will probably increase ___ or decrease ___ (Check one) between

_____ and _____ % in the next two years
_____ and _____ % in the next five years
_____ and _____ % in the next ten years

Appalachia Educational Laboratory

Health Manpower Project
Appalachia Educational Laboratory, Inc.
P. O. Box 1348
Charleston, West Virginia 25325

APPENDIX C

Senate Bill No. 483

ENROLLED

Senate Bill No. 483

(By Mr. Galperin and Mr. Kusic)

[Passed April 8, 1977; in effect ninety days from passage.]

AN ACT to amend chapter thirty of the code of West Virginia, one thousand nine hundred thirty-one, as amended, by adding thereto a new article, designated article twenty-three, relating generally to the practice of radiologic technology and the licensing of persons engaging in the practice of radiologic technology; setting forth certain legislative findings and a declaration of purpose; defining terms; requiring the licensing of persons engaged in the practice of radiologic technology; providing prohibitions and restrictions on certain activities; creating the West Virginia radiologic technology board of examiners; relating to the appointment, qualifications, terms of office, oath, removal and expenses of members of the board; relating to the officers, meetings and quorum of the board; relating to vacancies on the board; specifying powers and duties of the board; relating to the receipt and disbursement of funds; establishing qualifications of applicants for license; providing for reciprocal licensing of certain radiologic technologists; exempting certain persons from license requirements; authorizing issuance of license to persons who have practiced radiologic technology at least one of the last five years under certain circumstances, without examination and without meeting certain educational requirements; relating to applications and fees; providing for the issuance of license, renewal thereof and fees in connection therewith; relating to the issuance of a temporary permit to practice radiologic technology; authorizing the board to suspend or revoke license or temporary permit and establishing the grounds therefor; authorizing board to conduct investigations and hold hearings; relating to hearing

procedures; providing a time and place for such hearings; specifically making chapter twenty-nine-a of the code applicable; authorizing the board to issue subpoenas and subpoenas duces tecum; providing automatic stay or suspension of certain orders of board pending hearing; relating to the cost of any such hearing; providing for judicial review of decisions of the board entered following hearing, providing for appeals to the supreme court of appeals; providing legal representation for the board; providing for injunctive relief; and establishing criminal offenses and penalties.

Be it enacted by the Legislature of West Virginia:

That chapter thirty of the code of West Virginia, one thousand nine hundred thirty-one, as amended, be amended by adding thereto a new article, designated article twenty-three, to read as follows:

ARTICLE 23. RADIOLOGIC TECHNOLOGISTS.

§30-23-1. Legislative findings and declarations of public policy.

The Legislature finds and declares that in the interest of public health, the people of this state should be protected from excessive and improper exposure to ionizing radiation. It is the purpose of this article to establish minimum standards of education, training and experience for radiologic technologists and to prescribe means for assuring that these standards are met.

§30-23-2. Definitions.

Unless the context in which used clearly requires a different meaning, as used in this article:

(a) "Board" means the West Virginia radiologic technology board of examiners.

(b) "License" means a license granted and issued by the board for the practice of radiologic technology.

(c) "Licensed practitioner" means a person licensed to practice medicine, chiropractic, podiatry, osteopathy or dentistry.

(d) "Licensee" means any person holding a license or a temporary permit issued under the provisions of this article.

(e) "Radiologic technologist" means a person, other than a licensed practitioner who applies x-rays or assists in the application of x-rays to human beings for diagnostic or therapeutic purposes under the supervision of a licensed practitioner.

(f) "Radiologic technology" means the application of x-rays or assisting in the application of x-rays to human beings for diagnostic or therapeutic purposes under the supervision of a licensed practitioner.

(g) "Radiologist" means a licensed practitioner who specializes in the use of ionizing radiation for the diagnosis or treatment of disease.

(h) "Radiology resident" means a licensed practitioner who is in training to become a radiologist and who uses ionizing radiation in the diagnosis or treatment of disease, under the supervision of a radiologist.

(i) "Supervision" means responsibility for and control of quality, radiation safety and technical aspects in the application of ionizing radiation of human beings for diagnostic or therapeutic purposes.

(j) "Technology" hereinafter relates to radiologic technology.

§30-23-3. License required.

(a) No person may engage in, offer to engage in, or hold himself out to the public as being engaged in, the practice of radiologic technology in this state, nor may any person use in connection with any trade, business, profession or occupation, except in those instances specifically provided in subdivisions (1), (2), (3) and (4), subsection (c), section six of this article, the word radiologic technologist or any other title, word or abbreviation which induces or tends to induce the belief that such person is qualified to engage or is engaged in the practice of radiologic technology, unless and until he first obtains a license or temporary permit to engage in the practice of radiologic technology in accordance with the provisions of this article, which license or temporary permit remains unexpired, unsuspended and unrevoked: *Provided*, That no such license or temporary permit may be required for a radiologic technologist

who is not a resident of this state, who is the holder of a license or certificate to engage in the practice of radiologic technology issued by a state with licensing or certification requirements determined by the board to be at least equal to those provided in this article, who has no regular place of practice in this state and who engages in the practice of radiologic technology in this state for a period of not more than ten days in any calendar year.

(b) No firm, association or corporation may, except through a licensee or licensees, render any service or engage in any activity which if rendered or engaged in by any individual would constitute the practice of radiologic technology.

§30-23-4. Creation of board of examiners of radiologic technologists; members; appointment by governor; qualifications; terms; vacancies; officers; oath; compensation; general provisions.

There is hereby created a West Virginia radiologic technology board of examiners, hereinafter called the board. The governor shall appoint the members of such board, by and with the advice and consent of the Senate. The board shall consist of seven members, composed of one member from the division of radiologic health of the West Virginia state department of health, three licensed practitioners, two of whom shall be radiologists, and three radiologic technologists who are licensed hereunder, or, in the case of the members first appointed, are eligible for a license hereunder without passing a proficiency examination if such person has a total of three years' experience as a radiologic technologist immediately prior to the effective date of this article.

Each member shall be appointed for a term of three years and shall serve until a successor has been appointed and has qualified: *Provided*, That of the first appointees, a licensed practitioner and a radiologic technologist shall each be appointed for a term of one year, a licensed practitioner and a radiologic technologist shall each be appointed for a term of two years and a licensed practitioner, a radiologic technologist and a

representative from the division of radiologic health, West Virginia state department of health shall each be appointed for a term of three years. All members of the board shall be residents of West Virginia. A member may succeed himself. Vacancies shall be filled by appointment by the governor for the unexpired term. Before entering upon the performance of his duties, each member shall take and subscribe to the oath required by section five, article four of the constitution of this state.

The board shall elect from its membership a chairman and secretary who shall serve at the will and pleasure of the board. A majority of the members of the board constitutes a quorum, and meetings shall be held at the call of the chairman or upon the written request of three members at such time and place as designated in such call or request, and, in any event, the board shall meet at least twice annually to conduct the examination hereinafter provided for and to transact such other business as may come before it. The board shall hold its first meeting within thirty days after the appointment of the members. The members of the board shall receive no compensation for their services as members, but shall be reimbursed for all reasonable and necessary expenses actually incurred in the performance of their duties under this article. Any member may be removed by the governor in case of incompetency, neglect of duty, gross immorality or malfeasance in office.

§30-23-5. Board of examiners; powers and duties; funds of board.

(a) The board shall:

(1) Promulgate reasonable rules and regulations implementing the provisions of this article and the powers and duties conferred upon the board hereby and such reasonable rules and regulations shall be promulgated in accordance with the provisions of article three, chapter twenty-nine-a of this code;

(2) Examine applicants and determine their eligibility for a license or temporary permit to practice radiologic technology;

(3) Prepare, conduct and grade an examination of applicants for a license and determine the satisfactory passing score thereon;

(4) Issue, renew, deny, suspend or revoke licenses and temporary permits to engage in the practice of radiologic technology in accordance with the provisions of this article and, in accordance with the administrative procedures hereinafter provided, review, affirm, reverse, vacate or modify its order with respect to any such denial, suspension or revocation;

(5) Investigate alleged violations of provisions of this article, reasonable rules and regulations promulgated hereunder and orders and final decisions of the board and take appropriate disciplinary action against any licensee for the violation thereof or institute appropriate legal action for the enforcement of the provisions of this article, rules and regulations promulgated hereunder and orders and final decisions of the board;

(6) Employ, direct, discharge and define the duties of full or part-time professional, clerical or other personnel necessary to effectuate the provisions of this article;

(7) Keep accurate and complete records of its proceedings, certify the same as may be appropriate, and prepare, from time to time, a list showing the names and addresses of all licensees;

(8) Provide standards for approved schools of technology, procedures for obtaining and maintaining approval, and procedures of revocation of approval where standards are not maintained: *Provided*, That such standards for approved schools meet at least the minimal requirements of the American society of radiologic technologists;

(9) Whenever it deems it appropriate, confer with the attorney general or his assistants in connection with all legal matters and questions; and

(10) Take such other action as may be reasonably necessary or appropriate to effectuate the provisions of this article.

(b) All moneys paid to the board shall be accepted by a person designated by the board and deposited by

him with the treasurer of the state and credited to an account to be known as the "board of examiners of radiologic technologist fund." The reimbursement of all reasonable and necessary expenses actually incurred by members of the board and all other costs and expenses incurred by the board in the administration of this article shall be paid from such fund, and no part of the state's general revenue fund shall be expended for this purpose.

§30-23-6. Qualifications of applicants; exceptions; applications; fee.

(a) To be eligible for a license to practice radiologic technology the applicant must:

(1) Be of good moral character;

(2) Have completed four years of high school education or its equivalent;

(3) Have successfully completed a minimum twenty-four-month course in radiologic study in a school of radiologic technology approved by the board;

(4) Have passed the examination prescribed by the board, which examination shall cover the basic subject matter of radiologic technology, skills and techniques; and

(5) Not have been convicted of a felony in any court in this state or any federal court in this or any other state within ten years preceding the date of application for registration, which conviction remains unreversed; and not have been convicted of a felony in any court in this state or any federal court in this or any other state at any time if the offense for which he was convicted related to the practice of radiologic technology, which conviction remains unreversed.

(b) Any person who holds a license or certificate, including the American Registry of Radiologic Technologists, to practice radiologic technology issued by any other state, the requirements for which license or certificate are found by the board to be at least equal to those provided in this article, shall be eligible for a license to practice radiologic technology in this state without examination.

(c) The following persons are not required to obtain a license in accordance with the provisions of this article:

(1) A technology student enrolled in or attending an approved school of technology who as part of his course of study applies ionizing radiation to a human being under the supervision of a licensed practitioner;

(2) A person acting as a dental assistant who under the supervision of a licensed dentist operates only radiographic dental equipment for the sole purpose of dental radiography;

(3) A person engaged in performing the duties of a technologist in his employment by an agency, bureau or division of the government of the United States; and

(4) Any licensed practitioner, radiologist or radiology resident.

(d) Any person who has engaged in the practice of radiologic technology in this state for a period of three years or more within the last five years as of the effective date of this article is eligible for a license to engage in the practice of radiologic technology without examination and without meeting the requirements of subdivision (3), subsection (a) of this section, if application for such license is made within twelve months after the effective date of this article and if such person meets the requirements of subdivisions (1), (2) and (5), subsection (a) of this section.

(e) Any person who has been engaged as a radiologic technologist for at least one of the three years immediately prior to the effective date of this article and passes a proficiency examination prepared by the board is eligible for a license to engage in the practice of radiologic technology without further examination and without meeting the requirements of subdivision (3), subsection (a) of this section, if application for such license is made within twelve months after the effective date of this article and if such person meets the requirements of subdivisions (1), (2) and (5), subsection (a) of this section.

(f) Any applicant for any such license shall submit an application therefor at such time (subject to the time

limitation set forth in subsection (d) of this section), in such manner, on such forms and containing such information as the board may from time to time by reasonable rule and regulation prescribe, and pay to the board a license fee of thirty dollars, which fee shall be returned to the applicant if he is denied a license.

§30-23-7. Issuance of license; renewal of license; renewal fee.

Whenever the board finds that an applicant meets all the requirements of this article for a license to engage in the practice of radiologic technology, it shall forthwith issue to him such license; and otherwise the board shall deny the same. The license is valid for a period of two years from the date issued and shall be renewed every two years without examination upon application for renewal on a form prescribed by the board and payment to the board of a renewal fee of twenty dollars: *Provided*, That the board may deny an application for renewal for any reason which would justify the denial of an original application for a license.

§30-23-8. Temporary permits.

Upon proper application the board may issue a temporary permit to engage in the practice of radiologic technology in this state to an applicant who meets the qualifications of subdivisions (1), (2), (3) and (5), subsection (a), section six of this article, pending examination of such applicant, which temporary permit shall expire thirty days after the board gives written notice of the results of the examination held following the issuance of such temporary permit, and such permit may not be renewed or another thereof issued to the same person.

§30-23-9. Suspension or revocation of license or temporary permit.

(a) The board may at any time upon its own motion and shall upon the verified written complaint of any person conduct an investigation to determine whether there are grounds for suspension or revocation of a license or a temporary permit issued under the provisions of this article.

(b) The board shall suspend or revoke any license or temporary permit when it finds the holder thereof has:

(1) Been convicted of a felony in any court in this state or any federal court in this or any other state within ten years preceding the date of the motion or complaint, which conviction remains unreversed; or been convicted of a felony in any court in this state or any federal court in this or any other state at any time if the offense for which he was convicted related to the practice of radiologic technology, which conviction remains unreversed;

(2) Obtained a license or temporary permit by means of fraud or deceit;

(3) Been incompetent, grossly negligent, or guilty of other malpractice as defined by the board by reasonable rules and regulations;

(4) Failed or refused to comply with the provisions of this article or any reasonable rule and regulation promulgated by the board hereunder or any order or final decision of the board; or

(5) Except in emergency situations, failed to obtain written authorization from the attending licensed practitioner or from the patient, and if the patient is a minor, from a parent or a person having custody of the minor.

(c) The board shall also suspend or revoke any license or temporary permit if it finds the existence of any grounds which would justify the denial of an application for such license or temporary permit if application were then being made for it.

§30-23-10. Procedures for hearing.

(a) Whenever the board denies an application for any original or renewal license or denies an application for a temporary permit or suspends or revokes any license or temporary permit, it shall make an interim order to that effect and serve a copy thereof on the applicant or licensee, as the case may be, by certified mail, return receipt requested. Such order shall state the grounds for the action taken and shall require that any license or temporary permit suspended or revoked thereby shall be

returned to the board by the holder within twenty days after receipt of said copy of said order.

(b) Any person adversely affected by any such order is entitled to a hearing thereon (as to all issues not excluded from the definition of a "contested case" as set forth in article one, chapter twenty-nine-a of this code) if, within twenty days after receipt of a copy thereof, he files with the board a written demand for such hearing. A demand for hearing shall operate automatically to stay or suspend the execution of any order suspending or revoking a license or temporary permit or denying an application for a renewal license. The board may require the person demanding such hearing to give reasonable security for the cost thereof and if such person does not substantially prevail at such hearing such cost shall be assessed against him and may be collected by civil action or other proper remedy.

(c) Upon receipt of a written demand for such hearing, the board shall set a time and place therefor not less than ten and not more than thirty days thereafter. Any scheduled hearing may be continued by the board upon its own motion or for good cause shown by the person demanding the hearing.

(d) All of the pertinent provisions of article five, chapter twenty-nine-a of this code apply to and govern the hearing and the administrative procedures in connection with and following such hearing, with like effect as if the provisions of said article five were set forth in this subsection.

(e) Any such hearing shall be conducted by a quorum of the board. For the purpose of conducting any such hearing any member of the board may issue subpoenas and subpoenas duces tecum which shall be issued and served within the time, for the fees and shall be enforced as specified in section one, article five of said chapter twenty-nine-a, and all of the said section one provisions dealing with subpoenas and subpoenas duces tecum shall apply to subpoenas and subpoenas duces tecum issued for the purpose of a hearing hereunder.

(f) At any such hearing the person who demanded

the same may represent himself or be represented by an attorney-at-law admitted to practice before any circuit court of this state. Upon request by the board, it shall be represented at any such hearing by the attorney general or his assistants without additional compensation.

(g) After any such hearing and consideration of all testimony, evidence and record in the case, the board shall render its decision in writing. The written decision of the board shall be accompanied by findings of fact and conclusions of law as specified in section three, article five, chapter twenty-nine-a of this code, and a copy of such decision and accompanying findings and conclusions shall be served by certified mail, return receipt requested, upon the person demanding such hearing, and his attorney of record if any.

(h) The decision of the board is final unless reversed, vacated or modified upon judicial review thereof in accordance with the provisions of section eleven of this article.

§30-23-11. Judicial review; appeal to supreme court of appeals; legal representation for board.

Any person adversely affected by a decision of the board rendered after a hearing held in accordance with the provisions of section ten of this article is entitled to judicial review thereof. All of the pertinent provisions of section four, article five, chapter twenty-nine-a of this code apply to and govern such judicial review with like effect as if the provisions of said section four were set forth in this section.

The judgment of the circuit court is final unless reversed, vacated or modified on appeal to the supreme court of appeals in accordance with the provisions of section one, article six, chapter twenty-nine-a of this code.

Legal counsel and services for the board in all appeal proceedings in any circuit court and the supreme court of appeals shall be provided by the attorney general or his assistants and in any circuit court by the prosecuting attorney of the county as well, all without additional compensation.

§30-23-12. Actions to enjoin violations.

Whenever it appears to the board that any person has been or is violating or is about to violate any provision of this article, any reasonable rule and regulation promulgated hereunder or any order or final decision of the board, the board may apply in the name of the state to the circuit court of the county in which the violation or violations or any part thereof has occurred, is occurring or is about to occur, for an injunction against any such person and any such other persons who have been, are or are about to be, involved in any practice, acts or omissions, so in violation, enjoining such person or persons from any such violation or violations. Such application may be made and prosecuted to conclusion whether or not any such violation or violations have resulted or shall result in prosecution or conviction under the provisions of section thirteen of this article.

Upon application by the board, the circuit courts of this state may by mandatory or prohibitory injunction compel compliance with the provisions of this article, the reasonable rules and regulations promulgated hereunder and all orders and final decisions of the board. The court may issue a temporary injunction in any case pending a decision on the merits of any application filed.

The judgment of the circuit court upon any application permitted by the provisions of this section shall be final unless reversed, vacated or modified on appeal to the supreme court of appeals. Any such appeal shall be sought in the manner and within the time provided by law for appeals from circuit courts in other civil actions.

The board shall be represented in all such proceedings by the attorney general or his assistants and in such proceedings in the circuit court by the prosecuting attorneys of the several counties as well, all without additional compensation.

§30-23-13. Penalties.

Any person who violates any provisions of this article, any of the reasonable rules and regulations promulgated hereunder or any order or any final decision of the board

shall be guilty of a misdemeanor, and, upon conviction thereof, shall be fined not more than one thousand dollars, or imprisoned in the county jail not more than six months, or both fined and imprisoned.

The Joint Committee on Enrolled Bills hereby certifies that the foregoing bill is correctly enrolled.

_____
Chairman Senate Committee

_____
Chairman House Committee

Originated in the Senate.

To take effect ninety days from passage.

_____
Clerk of the Senate

_____
Clerk of the House of Delegates

_____
President of the Senate

_____
Speaker House of Delegates

_____

The within _____ this the _____

day of _____, 1977.

_____
Governor

APPENDIX D

Senate Bill No. 168

ENROLLED

Senate Bill No. 168

(By Mr. Hatfield and Mr. Jones)

[Passed March 11, 1976; in effect ninety days from passage.]

AN ACT to amend and reenact article three-a, chapter thirty of the code of West Virginia, one thousand nine hundred thirty-one, as amended, relating to physician assistants: providing for definitions; rules and regulations of the board; certification and classification of physician assistants; temporary certification; recertification; responsibilities of supervising physician; identification requirements; limitations on physician assistants; unlawful use of title of physician assistant; unlawful representation as physician; and providing criminal offenses and penalties.

Be it enacted by the Legislature of West Virginia:

That article three-a, chapter thirty of the code of West Virginia, one thousand nine hundred thirty-one, as amended, be amended and reenacted, to read as follows:

ARTICLE 3A. ASSISTANTS TO PHYSICIANS.

§30-3A-1. Definitions.

As used in this article the following terms shall have the following meanings:

(a) "Board" means the medical licensing board of West Virginia.

(b) "Type 'A' physician assistant" means an assistant to a primary care physician who is a graduate of an approved program of instruction in primary health care, who has passed the national certification examination and is qualified to perform direct patient care services under the supervision of the primary care physician.

(c) "Type 'B' physician assistant" means an assistant to the physician who is a graduate of an approved program for instruction in a recognized clinical speciality or has received training from a physician adequate to qualify him to perform patient services in that specialty as defined by the supervising physician.

(d) "Supervising physician" means a doctor of medicine, or podiatry permanently licensed in West Virginia who assumes legal and supervisory responsibility for the work or training of any physician assistant in his employment.

(e) "Approved program" means an educational program for physician assistants approved and accredited by the American medical association, or American podiatry association.

(f) "Health care facility" means any licensed hospital, nursing home, extended care facility, state health or mental institutions, clinic or physician's office.

§30-3A-2. Medical licensing board; rules and regulations; limitations.

(a) The board shall promulgate rules and regulations governing the extent to which physician assistants may function within this state.

Such regulations shall provide:

(1) That the physician assistant shall be limited to the performance of those services for which he is trained; and

(2) That each physician assistant shall perform only under the supervision and control of a physician permanently licensed in this state, but such supervision and control shall not require the personal presence of the supervising physician at the place or places, where services are rendered: *Provided*, That the physician assistant's normal place of employment shall be on the premises of his supervising physician. The supervising physician may send the physician assistant off the premises of the supervising physician to perform duties at his direction, but no separate place of work for the physician assistant shall be established, other

than premises which are established by, and for the practice of the supervising physician.

(b) In promulgating such rules and regulations, the board shall allow the physician assistant to perform those procedures and examinations submitted to the board in the job description pursuant to section five of this article.

(c) In addition thereto, the board shall compile and publish an annual report that includes a list of currently certified physician assistants, their employers and location in the state; a list of approved programs; the number of graduates per year of such approved programs and the number of physician assistants from other states practicing in West Virginia.

§30-3A-3. Certification.

(a) The board shall certify as a Type A physician assistant any person who files an application and furnishes evidence to the board that he has met the following standards for qualification for the type of physician assistant certificate for which he has applied:

(1) Shall be a graduate of an approved program of instruction in primary health care, and

(2) Shall successfully have passed the examination for a primary care physician assistant and be certified by the national board of medical examiners, and

(3) Shall be of good moral character.

(b) The board may certify as a Type B physician assistant any person who files an application and furnishes evidence to the board that he has met the following standards for qualification for the type of physician assistant certificate for which he has applied:

(1) Shall be a graduate of an approved program in a recognized clinical specialty, or

(2) Shall have received specialized training and experience from a physician adequate for him to perform patient services in that specialty, and

(3) Shall be of good moral character.

(c) Certification of an assistant to a physician prac-

ticing the specialty of ophthalmology shall neither be required nor permitted under this article.

§30-3A-3a. Temporary certification.

When any graduate of an approved program submits an application to the board, accompanied by a job description in conformity with section five of this article, for a Type A physician assistant certificate, the board shall issue to such applicant a temporary certificate allowing such applicant to function as a Type A physician assistant for the period of one year. Said temporary certificate may be renewed for one additional year upon the request of the supervising physician. A Type A physician assistant who has not been certified as such by the national board of medical examiners will be restricted to work under the direct supervision of the supervising physician.

When any person who meets the qualifications for a Type B physician assistant as defined in this section and who submits an application accompanied by a job description for a Type B physician assistant certificate, the board mey certify such applicant as a Type B physician assistant for a period of four months. Upon expiration of the four-month temporary certification, the board may certify the applicant as a Type B physician assistant. During the period of temporary certification, the Type B physician assistant shall be restricted to work under the direct supervision of the supervising physician.

As of the effective date of this article, any person holding a valid certificate from the board allowing such person to practice as a physician assistant within this state shall be eligible for certification for a period of one year as a Type A or Type B physician assistant depending upon such person's education, training or experience, as determined by the board.

§30-3A-3b. Recertification.

Certification of a Type B physician assistant shall be subject to review and recertification annually for the first five years following the first certification. Such recertification shall require the supervising physician

of a Type B physician assistant to report to the board on the status of the Type B physician assistant. This report shall include a performance evaluation, a summary of experience or continuing medical education, and any proposed changes in job description.

§30-3A-4. Reciprocity.

The board may certify as a physician assistant in this state, without examination, any person who has been so certified or licensed by examination in another state of the United States which has requirements substantially equivalent to the requirements contained in this article.

§30-3A-5. Job description.

Any supervising physician making application to the medical licensing board to employ either a Type A or Type B physician assistant shall provide a job description which shall set forth the range of medical services to be provided by such assistant. Before employing a physician assistant the supervising physician must obtain approval of the job description from the board. The board shall have the power to revoke or suspend any certification of an assistant to a physician or podiatrist, for cause, after having given the person an opportunity to be heard in the manner provided by sections eight and nine, article one, chapter thirty of this code.

§30-3A-6. Supervising physician—responsibilities.

The supervising physician is responsible for observing, directing and evaluating the work, records and practices performed by the physician assistant pursuant to this article. The supervising physician shall notify the medical licensing board, in writing, of any termination of the employment of his physician assistant within ten days of said termination. The legal responsibility for any physician assistant shall remain that of the employing physician or physicians at all times including occasions when the assistant, under the direction and supervision of the employing physician or physicians, aids in the care and treatment of patients in health care facilities. Such health care facilities shall not be legally responsible for

the actions or omissions of the physician assistant, unless such physician assistant is an employee of the facility.

§30-3A-7. Identification of physician assistant.

(a) When functioning as a physician assistant, the physician assistant shall wear a name tag which identifies the physician assistant as a physician assistant and which also specifies the type of classification of such assistant and the name of his supervising physician.

(b) A two and one-half by three and one-half inch card of identification shall be furnished by the board upon certification of the physician assistant and shall specify the type of classification.

§30-3A-8. Limitations on employment of physician assistants.

(a) A supervising physician shall not employ at any one time more than two physician assistants.

(b) Physician assistants shall not sign prescriptions. He shall not perform any service which his employing supervising physician is not qualified to perform. Further, he shall not perform any service which is not included in his job description and approved as provided in section five of this article.

(c) Nothing in this article shall be construed to authorize physician assistants to perform those specific functions and duties delegated by law to those persons licensed as chiropractors, dentists, dental hygienists, optometrists, pharmacists, or certified as nurse anesthetists.

§30-3A-9. Fees.

Each job description submitted by a licensed supervising physician or supervising physicians shall be accompanied by a fee of fifty dollars. A fee of five dollars shall be charged for the annual renewal of the certificate.

§30-3A-10. Unlawful use of title of "Physician Assistant"; penalty.

It shall be unlawful for any person who is not certified by the board as a physician assistant to use the title of

"physician assistant" or to represent to any other person that he is a physician assistant. Any person who shall violate the provisions of this section shall be guilty of a misdemeanor, and, upon conviction thereof, shall be fined in an amount not to exceed two thousand dollars.

§30-3A-11. Unlawful representation of physician assistant as a physician; penalty.

It shall be unlawful for any physician assistant, as defined in sections one-(b) and one-(c) of this article, to represent to any person that he is a physician or surgeon. Any person who shall violate the provisions of this section shall be guilty of a felony, and, upon conviction thereof, shall be confined in the penitentiary for not less than one nor more than two years, or be fined in an amount not to exceed two thousand dollars.

The Joint Committee on Enrolled Bills hereby certifies that the foregoing bill is correctly enrolled.

_____
Chairman Senate Committee

_____
Chairman House Committee

Originated in the Senate.

In effect ninety days from pasage.

_____
Clerk of the Senate

_____
Clerk of the House of Delegates

_____
President of the Senate

_____
Speaker House of Delegates

The within _____ this the _____ day of _____, 1976

_____
Governor

APPENDIX E

Notice of Public Hearing Regarding Regulations
for Physician's Assistants

F. J. HOLROYD, M.D.
Chairman
Princeton
N. H. DYER, M.D.
Secretary
State Office Building
1800 Washington Street
Charleston 25305

State of West Virginia

THE MEDICAL LICENSING BOARD
CHARLESTON 25305

NOTICE OF PUBLIC HEARING

A. T. McCOY, M.D.
Charleston
J. J. STARK, M.D.
Parkersburg
J. A. SMITH, M.D.
Dunbar
H. S. WEEKS, JR., M.D.
Wheeling
R. E. FLOOD, M.D.
Weirton
R. E. NEWMAN, M.D.
Beckley
C. A. HOFFMAN, M.D.
Huntington
M. L. DeMARIA, D.P.M.
Wheeling

The Medical Licensing Board of West Virginia pursuant to article three, chapter twenty-nine-a of the Code of West Virginia, one thousand nine hundred thirty-one, as amended shall convene a hearing at 11:00 a. m. on Monday, June 27, 1977, in the Conference Room of the State Department of Health, 1800 Washington Street, East, Room 522, Charleston, West Virginia for the purpose of taking evidence pertaining to the filing of regulations governing certification of Physicians Assistants.

All persons having evidence to present shall be present. The issues to be heard shall be limited to the actual information contained in the proposed regulations. All evidence to be considered shall be submitted in written form and delivered to the Medical Licensing Board Office on or before 4:30 p. m., Friday, June 24, 1977.

Copies of the proposed regulations may be obtained by telephoning 348-2921 on weekdays from 8:30 a. m. to 4:15 p. m.

DRAFT

THE MEDICAL LICENSING BOARD OF WEST VIRGINIA

dm. Reg. 16-1
eries IV

Effective
Date:

ection 8. REGULATIONS FOR PHYSICIAN'S ASSISTANTS

.01 Employment of Assistants by Licensed Physician or Podiatrist; Services That May Be Performed by Assistants. --

A medical physician or a podiatrist licensed under Chapter 30 of the Code of West Virginia may submit a job description to the Medical Licensing Board to employ a physician's assistant:

"Type 'A' physician assistant" means an assistant to a primary care physician who is a graduate of an approved program of instruction in primary health care, who has passed the national certification examination and is qualified to perform direct patient care services under the supervision of the primary care physician.

"Type 'B' physician assistant" means an assistant to the physician who is a graduate of an approved program for instruction in a recognized clinical specialty other than primary care or has received training from a physician adequate to qualify him to perform patient services in that specialty as defined by the supervising physician.

Type 'A' and 'B' applicants shall be of good moral character.

The delegation of certain acts shall be stated on the job description in a manner consistent with sound medical practice and with the protection of the health and safety of the patient in mind. Such services shall be limited to those which are educational, diagnostic, therapeutic or preventive in nature, but in no case shall they include the establishment of a final diagnosis or treatment plan for the patient, nor shall delegated acts include the prescribing or dispensing of drugs.

.02 Submission of Application; Job Description. --

An application completed by the applicant and a job description written and signed by the physician or podiatrist listing in numerical order the duties which will be performed by the assistant must be in the office of the Secretary of the Medical Licensing Board of West Virginia, State Office Building, 1800 Washington Street, Charleston, West Virginia 25305, thirty days prior to a Board meeting. Meetings are held bi-monthly, or as needed beginning in January. The filing of an application and job description does not entitle a physician's assistant to certification. The only legal authority for such approval must be given by the Medical Licensing Board.

03 Ad Interim Certification. --

Type 'A' physician assistant:

When any graduate of an approved program submits an application to the Board, accompanied by a job description for a Type 'A' physician assistant certificate, the Board shall issue to such applicant a temporary certificate allowing such applicant to function as a Type 'A' physician assistant for the period of one year. Said temporary certificate may be renewed for one additional year upon the request of the supervising physician. A Type 'A' physician assistant who has not been certified as such by the national board of medical examiners will be restricted to working under the direct supervision of the supervising physician.

Type 'B' physician assistant:

When any person who meets the qualifications for a Type 'B' physician assistant as defined in these regulations, and who submits an application accompanied by a job description for a Type 'B' physician assistant certificate, the Board may certify such applicant as a Type 'B' physician assistant for a period of four months. Upon expiration of the four month temporary certification, the Board may certify the applicant as a Type 'B' physician assistant. During the period of temporary certification, the Type 'B' physician assistant shall be restricted to working under the direct supervision of the supervising physician.

Others:

As of the effective date of these regulations, any person holding a valid certificate from the Board allowing such person to practice as a physician assistant within this state shall be eligible for certification for a period of one year as a Type 'A' or Type 'B' physician assistant depending upon such person's education, training or experience, as determined by the Board.

04 Fee. -- A cashier's check or money order in the amount of $50.00 must accompany each application. Certification must be renewed annually at a fee of $5.00.

05 Requirements for Certification. --

a. Graduation from an educational physician's assistant training program as approved by the Board. (Photocopy of graduation certificate must accompany application.)

b. Evidence of certification by the National Board of Medical Examiners of having successfully passed the Certifying Examination for Primary Care Physician's Assistants. (Photocopy of examination result sheet must accompany application.)

c. Certification of a Type 'B' physician assistant shall be subject to review and recertification annually for the first five years following the first certification. Such recertification shall require the supervising physician to report to the Board on the status of the physician assistant. This report shall include a performance evaluation, a summary of experience or continuing medical education, and any proposed changes in the job description.

d. Other applicants as deemed qualified by the Board.

06 Certification of Assistant to Ophthalmologist Not Required or Permitted. --

Certification of an assistant to a physician practicing the specialty of ophthalmology shall neither be required nor permitted.

07 Annual Report of Physician's Assistants Performance. --
Annual Report of Board. --

The physician's assistants, Type 'A' and Type 'B' and the physicians or podiatrists must submit annual signed reports either individually or combined, as to the professional conduct, capabilities, and performance of those involved. Said report must accompany application for recertification and must be submitted to the office of the Secretary of the Medical Licensing Board by December 1. All applicants for recertification will be considered for renewal at the January board meeting.

In addition thereto, the Board shall compile and publish an annual report that includes a list of currently certified physician assistants, their employers and location in the state; a list of approved programs in West Virginia, the number of graduates per year of such approved programs and the number of physician assistants from other states' approved programs practicing in West Virginia.

08 Supervision and Control of Physician's Assistants. --

Each physician assistant shall perform only under the supervision and control of a physician permanently licensed in this state, but such supervision and control shall not require the personal presence of the supervising physician at the place or places, where services are rendered: Provided, that the physician assistant's normal place of employment shall be on the premises of his supervising physician. The supervising physician may send the physician assistant off the premises of the supervising physician to perform duties at his direction, but no separate place of work for the physician assistant shall be established, other than premises which are established by, and for the practice of the supervising physician.

Limitations on Employment and Scope of Duties of Physician Assistants. --

a. A supervising physician shall not employ at any one time more than two physician assistants.

b. Physician assistants shall not sign prescriptions.

c. Physician assistants shall not perform any service which his employing supervising physician is not qualified to perform.

d. Physician assistants shall not sign orders to be countersigned later by the employing supervising physician.

e. Physician assistants shall not perform any service which is not included in his job description and approved by the Board.

Identification of Physician Assistant. --

When functioning as a physician assistant, the physician assistant shall wear a name tag which identifies the physician assistant as a PHYSICIAN ASSISTANT and which also specifies the type of classification of such assistant and the name of his supervising physician.

The name tag, to be worn on the physician assistants outer garment, shall be not less than two and one-half inches long and size of print shall be not less than one-fourth inches in size.

Supervising Physician--Responsibilities. --

a. The supervising physician or physicians is responsible for observing, directing and evaluating the work, records and practices performed by the physician assistant.

b. It shall be the responsibility of the supervising physician or physicians to obtain consent in writing from the patient before Type 'A' and Type 'B' physician assistants can render general medical or surgical services; except in emergencies.

c. The supervising physician shall notify the Medical Licensing Board, in writing, of any termination of the employment of his physician assistant within ten days of said termination.

d. The legal responsibility for any physician assistant shall remain that of the employing physician or physicians at all times.

12 Termination of Certification. --

The certification of a Type 'A' or Type 'B' physician assistant shall be terminated by the Board when, after due notice and a hearing in accordance with the manner and form as prescribed by law for civil actions, if it is found:

a. That the assistant has held himself out or permitted another person to represent him as a licensed physician or podiatrist;

b. That the assistant has in fact performed other than at the direction and under the supervision of a physician or podiatrist licensed by the Board;

c. That the assistant has been delegated and performed a task or tasks beyond his competence and not in accordance with his job description as approved by the Board;

d. That the assistant is a habitual user of intoxicants or drugs to such an extent that he is unable to safely perform as an assistant to the physician or podiatrist;

e. That the assistant has been convicted in any court, state or federal, of any felony or other criminal offense involving moral turpitude;

f. That the assistant has been adjudicated a mental incompetent or whose mental condition renders him unable to safely perform as an assistant to a physician or podiatrist;

g. That the assistant has failed to comply with any of the provisions of these regulations or the statute.

13 Denial of Certification of Physicians Assistant. --

Whenever the Board determines that an applicant has failed to satisfy the Board that he should be certified, the Board shall immediately notify such applicant of its decision and indicate in what respect the applicant has so failed to satisfy the Board. Such applicant shall be given a formal hearing before the board upon request of such applicant filed with or mailed by registered mail to the Secretary of the Board at Charleston, West Virginia, within ten days after receipt of the Board's decision, stating the reasons for such request. The Board shall within 20 days of receipt of such request, notify such applicant of the time and place of a public hearing, which shall be held within a reasonable time. The burden of satisfying the Board of his qualifications for certification shall be upon the applicant. Following such hearing, the Board shall determine on the basis of these regulations whether the applicant is qualified to be certified, and this decision of the Board shall be final as to that application.